

THE IRON AGE

New York, May 30, 1929

ESTABLISHED 1855

VOL. 123, No. 22

Will High Money Rates Bring a Business Reaction?

BY VIRGIL JORDAN

UNDER present conditions there is no reason why the high rates for security loans that have prevailed in the market during the past year should in themselves cause a business recession, and it is unlikely that they will.

A drop in business activity may take place before the end of this year, but money rates will be a relatively unimportant and only an indirect factor in it. Unfavorable agricultural conditions, the reaction from excessive rate of automobile output, and other such factors in the actual business situation are likely to be more influential. Money rates, in combination with tariff revision, will probably affect our export more than our domestic trade.

In watching the effect of money rates on business it must be remembered that the high rates for call loans are not indicative of general credit conditions. It is true that security loans are now the dominant factor in the whole credit structure and probably exceed in the aggregate the total of commercial loans made by our banking system; but there is plenty of credit available for commercial purposes, and with rediscount rates still below the call market rate there is little danger that regular bank customers will find it hard to get accommodations.

The high level of call money rates is chiefly an indication of the relatively great demand for this type of credit in relation to the supply and does not indicate that there is any real shortage of credit for ordinary business purposes. The policy of the Federal Reserve System essentially has been directed toward maintaining this situation, by restricting so far as it could the supply of credit for security loan purposes and isolating

¶ Money rates are no longer so significant a factor in general business activity.

* * *

¶ Business has become much less dependent on ordinary bank accommodations.

* * *

¶ Cash and securities of 29 leading corporations total a billion and a half dollars—considerably more than the resources of the country's largest bank.

* * *

¶ Federal Reserve aim has been to isolate the security market from the general credit reservoir.

* * *

¶ Federal Reserve System will ultimately succeed in its purposes, despite the misunderstanding and sabotage to which it has been subjected.

* * *

¶ Absence of commodity inflation and control of credit resources by Reserve System are best safeguards against disturbance to industry through deflation in security prices.

* * *

¶ The clearest feature of the situation is that any mechanical forecast of the outcome is questionable.

the security market from the general credit reservoir so as to preserve an ample supply of funds for business. If this had not been done, high money rates would have affected business long before now and more drastically.

The fact that the Reserve banks threaten to raise their rediscount rate to 6 per cent indicates, perhaps, that they have had increasing difficulty in carrying out this policy; but the chief effect of this rise, if it occurs, will probably be felt in our export trade for reasons mentioned below. The fundamental and indispensable function of the Reserve System is to safeguard the credit resources of the country for the protection of business. It has had difficulty in doing this because of the development of new investment and other conditions in the money market; but its powers are still large and it will ultimately succeed in its purposes, despite the misunderstanding and sabotage to which it has been subjected.

Besides the Federal Reserve policies other factors in the situation provide a further safeguard against the adverse effect of high money rates on business. Curiously enough some of these factors are the very ones that have added to the difficulties of the Federal Reserve System.

In the first place, there is reason to believe that the level of money rates is no longer as significant a factor in general business activity as it used to be. Business in this country is operating to a much smaller degree under the commercial credit system than it did before the war and is less dependent on ordinary bank accommodations. The total volume of so-called "all other loans" in our Reserve banking system—which includes a large proportion of real estate loans and instalment finance paper—

has shown relatively little growth in recent years, and if the real estate loans were taken out of this total, it is probable that ordinary commercial credit would show a decline. This is due to the fact that the larger corporations have increasingly financed their current operations, as well as their extensions and improvements, out of stock issues and besides have built up large cash reserves, which they have kept part of the time in the call market and which at all times have freed them from the need of direct bank borrowing for construction work, equipment and other improvements.

The recent increase in profits of the larger and stronger corporations has added to the cash reserves and is likely to continue to swell them, thus further fortifying industry against credit stringency. A good indication of the degree to which the larger business concerns have become independent of bank credit is afforded by a recent compilation, which showed that 29 leading American corporations at the end of last year held cash and securities totaling nearly a billion and a half dollars—resources considerably greater than those of the largest bank in the United States.

Building Unaffected by Money Rates

This is one of the reasons why high money rates have not so far seriously affected building construction and are not likely to affect it for some time. Industrial and commercial construction has been sustained despite high money rates, because these types of construction have not been so dependent upon direct borrowing or upon the flotation of bonds. Smaller residential construction likewise has been sustained by the enormous resources of the building and loan associations and the savings banks. Public works and utilities construction has been somewhat hampered by the slump in the bond market due to high rates, and large scale speculative residential building projects in the larger centers have likewise been hampered to some extent, although even here the expected slump has not materialized. The actual conditions of supply and demand for construction, particularly residential accommodation, are likely to be the dominant factor in the outlook for building.

Another important consideration is the fact that the larger companies in many lines are not moving their goods on the basis of the older forms of commercial credit but on instalment finance paper. Although a good deal of this paper is carried by banks directly or indirectly, much of it is sustained by outside financial resources. In any case, there is no evidence that higher money rates have as yet had any effect upon distribution on this basis, since the cost of instalment buying is such a small part of the cost of the goods, as for example in the case of automobiles, that a one per cent rise in money rates would make little difference.

No Stringency in Collections

As regards the smaller companies and retail and wholesale traders, operating on a cash or ordinary commercial credit basis, the situation is not quite so clear. There appears to be no evidence of any general stringency of collections in ordinary trade channels, and there is no reason to believe that there is any stringency of funds available through the Federal Reserve System for crop movements, although some of the smaller banks in the agricultural sections have doubtless impaired their ability to take care of local needs by putting their funds too largely in the call money market.

Whatever tightness of credit may have developed in ordinary trade channels, it is clear that it is greatly offset by the fact that inventories generally are low. In fact the tendency toward hand-to-mouth buying in the regular trade has advanced so far that there are complaints that retail trade has been suffering from an insufficiency of

stocks. Although in some lines manufacturers have had to hold the bag in the form of larger stocks, for the most part the complaint is based on the increased cost of business that must be done on small-lot orders for prompt delivery. Under these conditions the dependence of trade upon credit is greatly diminished and the effect of high money rates is minimized.

No Commodity Inflation

The best evidence that high money rates hold no danger for trade under present conditions lies in the fact that our high level of business activity in recent years has been accompanied by a stable or even declining price level, without sign of commodity price inflation. On this point most forecasts, my own included, have gone wrong. If prices had risen, as I expected them to, a speculative market in commodities would probably have developed rapidly, with forward buying and inventory accumulation, and in such a situation high money rates would certainly present a menace to business today. But as things stand it is difficult to see how the prevailing level of money rates or any prospective increase could precipitate the kind of liquidation in commodity markets that marked the collapse of 1920-1921. It is remarkable that, in face of an abundance of credit both within and outside our banking system for speculative purposes, and despite the favorable conditions created by the establishment of new commodity exchanges and marketing pools like the Copper Export Association, efforts to start a sustained bull movement in basic commodities have so far failed.

Even in face of the exceptionally prolonged high level of demand for iron and steel products there has been little evidence of a strong upward movement in prices. Whether this means that the commodity markets have been ruled by an underlying fear of business recession following a slump in the securities, or whether it implies a realization that a bull movement in commodities could not be sustained in the face of our enormous reserve productive capacity, is an open question. In any case, the situation is an unquestionable safeguard for business against the possible effects of high money rates.

Most people who admit these things insist, nevertheless, that a long continued period of high money rates holds a menace for business because of the threat of a collapse in the securities market which it implies. Here there is more ground for argument, but I think in the long run it will prove true that fundamental business conditions will rule the market rather than the reverse. That there is a marked degree of inflation in the security market cannot be questioned, nor can the fact that the course of this inflation will be determined by credit conditions and money rates for speculative purposes.

The securities market is in many ways seriously out of line with the present business situation and with the immediate prospects. It has discounted the future a long way ahead. The "new era" psychology has taken a very widespread hold upon the popular mind. We have had new eras before and as in the case of the last preceding one, during the eight years from 1899 to 1907, the rise of stock prices and the expansion of bank credit have run considerably ahead of the gain in volume of production and trade. During the past eight years, however, this discrepancy has been more marked than ever before in our history.

Despite the enormous advances we have made, there has been no such growth of general business, no such increase in general prosperity and no such gain of efficiency in production and distribution as is implied in the unprecedented bull market we have witnessed. During 1928, for instance, the actual increase in the aggregate productive and trade activity of the country was considerably less than the normal 4 per cent increase that has characterized our development for the past 50 or 75

years. Yet the scramble for a stake in the future growth of business has been so enormous and widespread that it has made a great drain upon our credit resources, and the high level of money rates is a direct reflection of this apparently inexhaustible demand for loans to discount the future immediately.

Federal Reserve Has Securities Speculation in Hand

Nevertheless there has been much misunderstanding and exaggeration on both sides of this question. I believe the Federal Reserve System has the situation well in hand and will steadily increase its control, if it has the moral support of the business community that it is trying to protect. It is particularly important for business to realize what the Federal Reserve System is trying to do for the protection of American business in its efforts to control the international movements of funds.



VIRGIL JORDAN has been chief economist of the National Industrial Conference Board, New York, for the past eight and one-half years. He is a frequent contributor of articles on current economic questions to magazines and newspapers. His analysis of this country's position as a creditor nation, with particular relation to the future course of world trade, was a brilliant contribution at the annual meeting of the Conference Board.

It is a serious mistake to believe that the United States is now a permanent and mature creditor nation with enormous reserves of credit by which it can constantly support a large volume of export trade. The fact is that in the past 10 years, despite the enormous flotation of foreign securities here, we have received, especially of late, more funds from abroad than we have sent out. These funds have come in as payment of interest, dividends and principal on our outstanding loans and as short-time funds for temporary investment in the New York money market. Our excess of exports has been paid for actually in part by gold and in larger part by the services we have bought from other countries.

This close and uncertain balance of our international financial relations has been, and is, of the greatest importance for domestic business. High money rates here and the attractive speculative market have been attracting funds here in large volume, and it is probable that there is between three and five billion dollars of foreign money here at present. Aside from the danger that these funds might be withdrawn in large part at small notice and create a temporary credit stringency here, our international financial position today is not very favorable for the support of our export trade, which is now a vital factor in domestic business. Already the stability of the foreign exchanges and the banking position of some foreign countries has been endangered by the security market situation in the United States. The Reserve authorities are bound to keep an eye on these developments if they are to protect American business.

Stock Market Deflation Not Serious Business Menace

There is no reason, however, why a readjustment in security prices should have a serious or long continued reaction upon business. American industry and trade

have grown with remarkable steadiness for 75 years at an almost uniform rate through the widest changes in security prices due to changing credit conditions. Market slumps have rarely been accompanied by any proportionate change in industrial activity for any length of time.

Today the absence of any sign of commodity inflation, and the control of credit resources afforded by the Federal Reserve System are the best safeguards against disturbance to industry through a deflation in security prices. The one doubtful element in the situation, however, is the widespread participation of the public in stock speculation. Insofar as a much larger proportion of the working population than ever before has taken a hand in the bull market and mortgaged its current income to buy stocks on margin in the hope of quick and easy gain, a serious drop in prices would doubtless impair the current buying power of the consumer to a larger extent than could have been true at any other time in our history. This is the more serious because of the additional factor of the spread of instalment selling; but no one can measure the danger here involved.

The clearest feature of the situation as a whole is that any mechanical forecast of the outcome on the basis of traditional rules is questionable. It is not necessary to join with the new era enthusiasts in believing that all rules are off and that the past throws no light on the present or the future at all, to realize that there are new factors in the situation which must be taken account of to arrive at a sane judgment. The power of the Federal Reserve System, as well as the development of new reservoirs of credit outside the banking system itself, and the unquestionable revolution in the organization, methods and financial policies of industry and commerce, all indicate that we are facing conditions that are in many important respects entirely novel. Some of them may aggravate the dangers involved while others minimize them.

The most hopeful feature of the situation today is undoubtedly the fact that a much larger proportion of the business community is better informed and more keenly aware of the importance of banking and credit conditions in our modern business structure and of the dangers that lie in a serious disturbance in them. There is also evidence throughout industry and trade of a spirit of conservatism in business, if not in financial matters, that provides a safeguard of stability.

Loosening of Hot Bolts

Builders of high temperature equipment, like high pressure steam boilers and chemical converters, look upon steels as behaving like very viscous fluids, said H. L. Guy, speaking before the British Institution of Mechanical Engineers on Jan. 31. They are found to extend continuously under comparatively low stresses and at an approximately constant rate depending on the stress and the temperature. The "limiting creep stress" is that below which this phenomenon is not noticed, or at least is less than 0.001 in. per inch in 100 hr.

Experiments at the National Physical Laboratory show that this limiting creep stress for commercial steels (carbons ranging from 0.17 to 0.51 per cent) is only 36 per cent as much at 900 deg. Fahr. as at 700 deg. Fahr. Or, put in another way, the load required to cause a creep of 0.001 in. per inch in 100 hr. at 900 deg. Fahr. is about 40 per cent that at 700 deg. Fahr. (for steels from 0.23 to 0.33 per cent carbon).

Mr. Guy said that experiments on creep should be much more precise; for instance, a creep of only one-tenth the above (i. e., 0.001 in. per inch in 1000 hr., which might be expected in mild steel at 900 deg. Fahr. if loaded to 6000 lb. per sq. in.) would cause an 18-in. tube or cylinder to increase in diameter at the rate of 5/32 in. per year.

Making Forgings by Machinery

Several Steps From Bar to Finished Piece—Trimming
Often a Separate Operation—
Upsetting in Bulldozer

BY HOLLOWAY KILBORN*

MAKING the forgings requires selection of the proper size hammer. Board hammers have a falling ram weight of a few hundred to several thousand pounds, while steam hammers vary from a few hundred pounds up to several tons. The proper size bar must be chosen, which in general may be round, square or flat. Sometimes the best size and shape of bar can be determined only by trial.

The operation of forging consists in heating the end of the bar, placing it on the lower die and allowing the upper die to fall repeatedly upon it. The bars are generally heated in oil-fired furnaces and strict attention must be given to the temperature and also to the character of the flame.

After being struck in the finishing impression the forging is cut off the bar and falls behind the machine. The bar is then put back into the furnace for reheating. One operator (with or without one or more helpers) has several bars, which he uses in rotation. A stream of

compressed air is generally directed toward the bottom die, to blow out any scale which might collect in the impression.

Several Steps Usually Required

There are generally several steps, stages, or impressions in a forging die. Fig. 8 shows the dies, outside trimmer and inside punch used in producing the arch punch shown in several stages of production in Fig. 9. The two die blocks in Fig. 8 fit face to face, so that when in use the left edge of the die on the left strikes against the right edge of the die on the right, and vice versa.

Considering the die on the right, the lower left corner is the "fuller," the right edge the "edger," the left impression is the "blanker," the right impression is the "finisher," and the upper left corner is the "cut-off." Around the edge of the finisher is a slight depression called the "gutter" where the excess metal flows.

This metal, called the "flash" or "fin," is removed by the outside trimming tools, which consist of a block of steel through which there is a hole of the exact contour of the piece to be trimmed, and a punch for pushing the piece through the hole. The punch is made to fit the piece

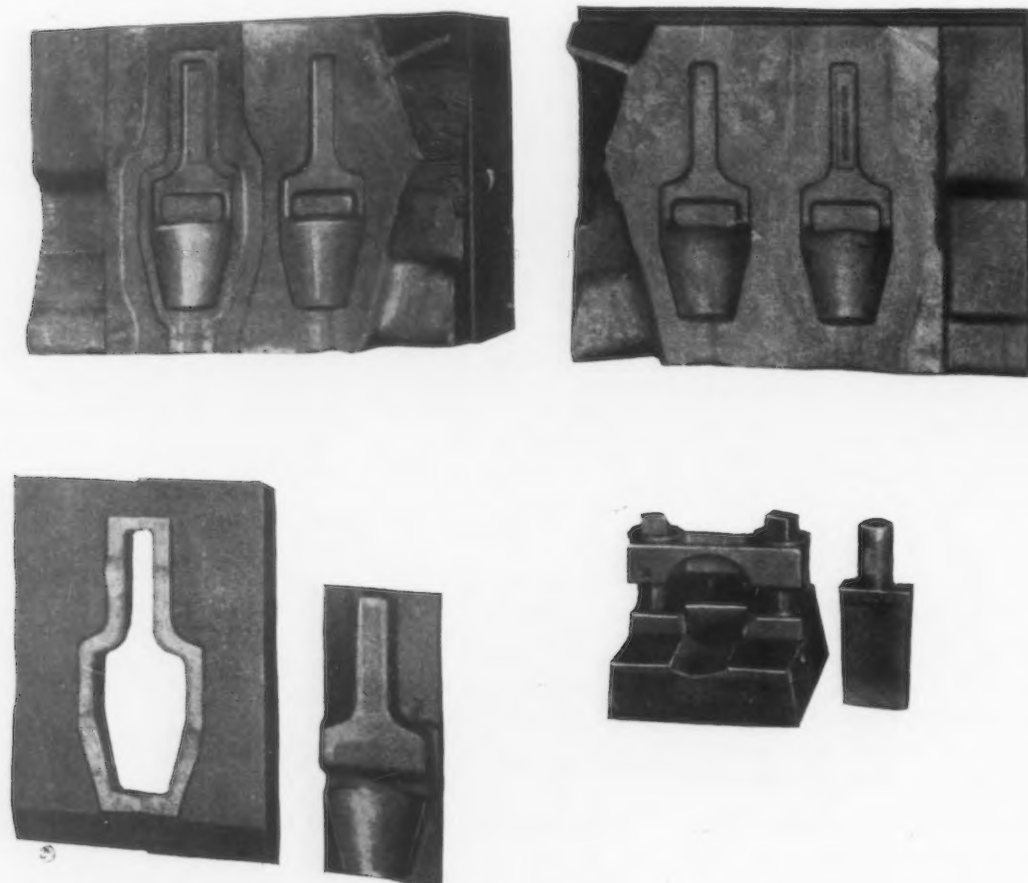


Fig. 8—A Pair of Forging Dies (Top) with the Outside Trimmers (Lower Left) and the Inside Punch (Lower Right)

*Treasurer, Kilborn & Bishop Co., New Haven, Conn. This is the last of three articles on forging and the equipment therefor. The others appeared in our issues of April 11, page 1003, and April 25, page 1151.

and also the hole, and the flash is cut off by the shearing action between the punch and the trimmer die. The trimmer die is made in two parts, to allow for shimming or grinding as the forging die wears.

Manner in Which the Work Progresses

In Fig. 9, from left to right (a) is the bar of steel used, (b) after fullering, (c) after being "rolled" in the

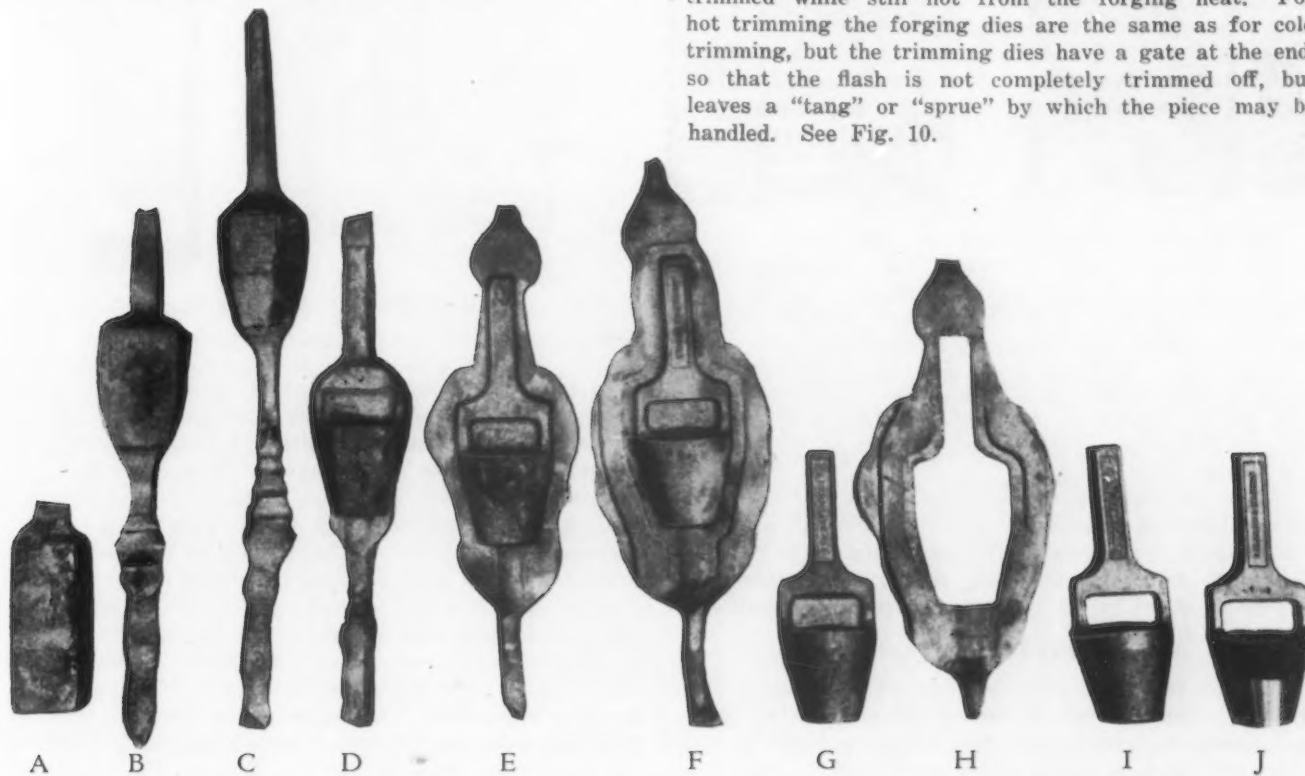


Fig. 9—Successive Stages in Producing the Forging for an Arch Punch (Above), as Explained in the Text

of the same section as (a). The operations from (a) to (f) are performed in one heating, the piece being then cooling for trimming and punching.

Trimming and Finishing a Forging

Most forgings are trimmed cold, but sometimes for the necessary exactness, or on account of the hardness of the material or for other reasons, the piece may be trimmed while still hot from the forging heat. For hot trimming the forging dies are the same as for cold trimming, but the trimming dies have a gate at the end, so that the flash is not completely trimmed off, but leaves a "tang" or "sprue" by which the piece may be handled. See Fig. 10.

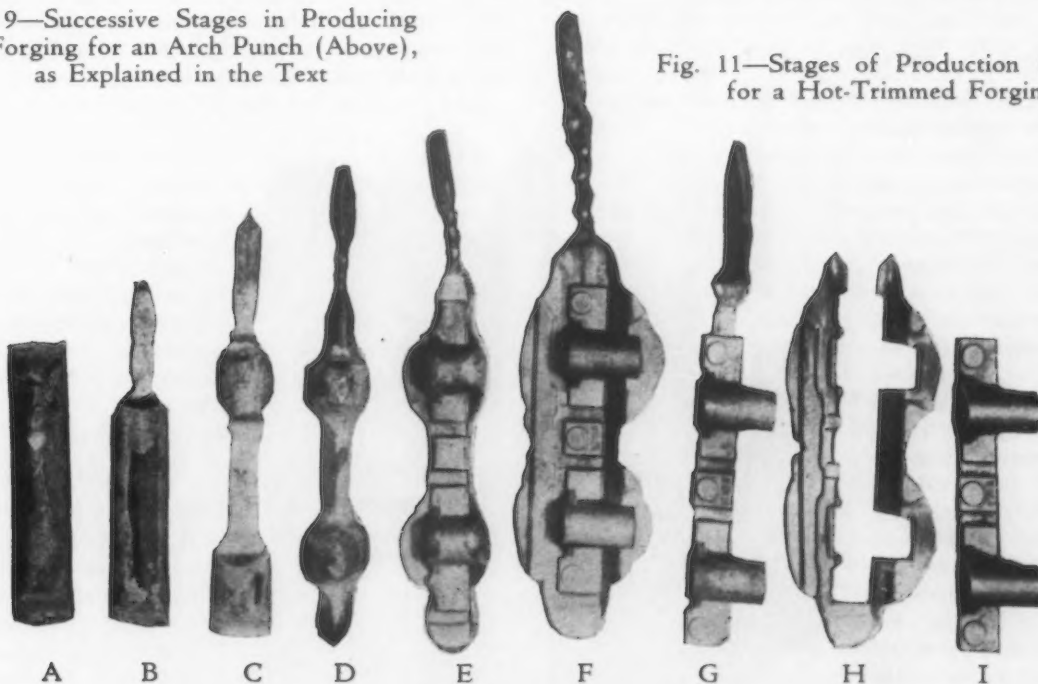


Fig. 11—Stages of Production (Below) for a Hot-Trimmed Forging

edger, (d) after one blow in the blanker, (e) after blanking, (f) after finishing (wording and final detail are in the finishing impression only), (g) after trimming, (h) is the flash, (i) after inside punching with the inside punching tools shown in Fig. 8 and (j) after all subsequent operations, showing the arch punch ready for sale.

The cut-off operation comes after (f), the piece up to that point being on the end of a bar a few feet long,

Fig. 11 shows the stages of production of a hot-trimmed forging: (a) the steel bar used, (b) after fullering the tang, (c) after fullering in the center, (d) after rolling in the edger, (e) after two blows in the impression, (f) after finishing, (g) after hot trimming, (h) showing the flash removed.

There is no blanking impression but only a finishing impression in this pair of dies. The number of impressions is largely determined by the quantity of forgings to

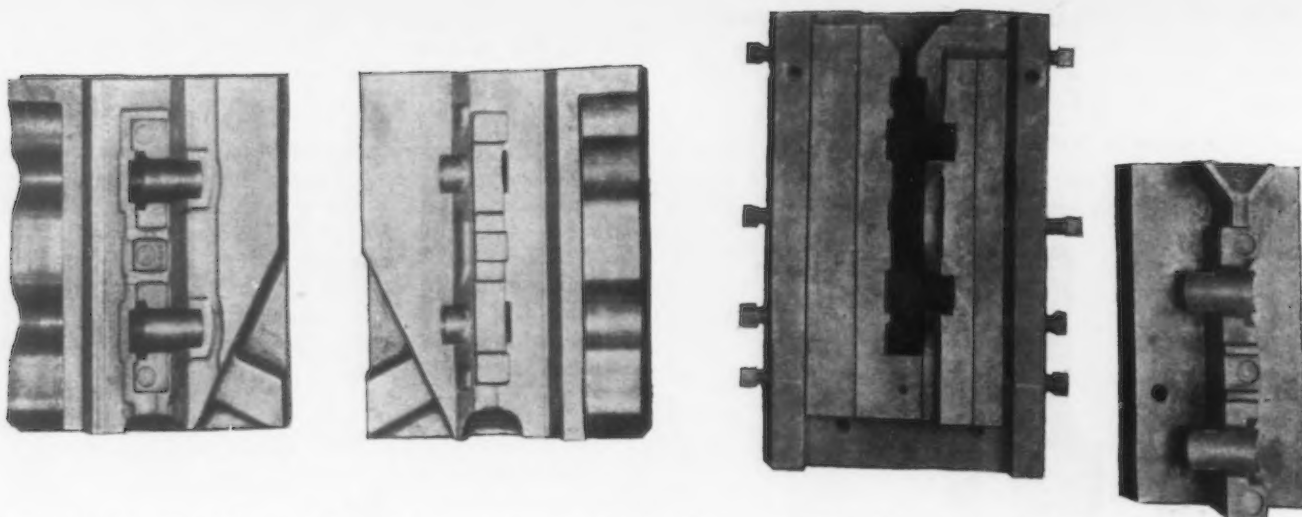


Fig. 10—Forging Dies (Left) and Trimming Tools, the Latter for Hot Trimming, with the Gate Showing at Upper End

be made. There may be three, a "rough blanking impression" being used before the "blanker," leaving the finishing impression to do very little work, so as to hold its exact shape and size.

After the flash is removed, the piece is "restruck" in the finishing impression and "retrimmed," and repeated again if necessary. The piece then is cut off and allowed to cool, and the tang is cut off, leaving the forging as shown in (i), ready for subsequent operations.

Cold Striking for Exact Contour

Another method of obtaining exactness in size is cold striking. This consists in taking the pieces after they have been cold trimmed and striking them again in another pair of dies, called cold-striking dies. These are made to exact size of the finished forging wanted, the cold-striking dies being made without any allowance for shrinkage. A slight flash may be here produced, which is trimmed off.

Although the variation of size of forgings by the three methods varies with different pieces, the cold-trimming method may be fairly represented as producing forgings uniform in thickness over a range of 0.020 in., while cold striking reduces this range to 0.006 in. and hot trimming lies between.

The width of a forging is determined by the trimming dies wherever they cut the flash, and the width at other points by the finishing impression, although in both hot-trimming and cold-striking methods further impressions may be in the dies, for striking the forgings when turned at some other angle than that at which they were originally struck.

After being trimmed, forgings are generally given a treatment to remove the scale which forms during the forging heat. This may be tumbling or rolling, pickling in a dilute solution of sulphuric acid (for steel), or

sand blasting. They may also be given a heat treatment called "normalizing," which produces, as does also annealing, a uniformity of hardness and a relieving of all unequal strains which may be in the metal. The advisability of any operation after trimming depends entirely on the use to which the forging is to be put, the operation of trimming being the last one necessarily embraced in the general term of Forging.

The operation of forging, and more especially of machine forging, greatly improves the quality of the metal because the severity of the blows permeates the entire piece. In hand forging there will be many different temperatures and weights of blows at different parts of the same forging, resulting in widely different physical properties. In machine forging the treatment is thorough and uniform. A very small allowance for subsequent machining is sufficient, and parts which do not require machining need only be polished, if such a finish is desired.

All forgings are superior to castings in their lack of possible blow holes and in their greater strength, due to their fibrous structure, instead of the crystalline structure of castings. Rolled bars from which forgings are generally made are fibrous and the blows of forging greatly refine and improve this condition.

Upsetting as a Forging Operation

UPSETTING may be done in a drop hammer by placing in a hole in the bottom die a bar longer than the depth of the hole, and allowing the upper die to strike it. This would mushroom the end and give it a shape in the nature of a gasoline engine poppet valve, or of a pencil barely protruding through a hole in a coin. When it is desired to have an upset other than that at the end of the bar, the lower die may be designed in two halves, so that one may be re-

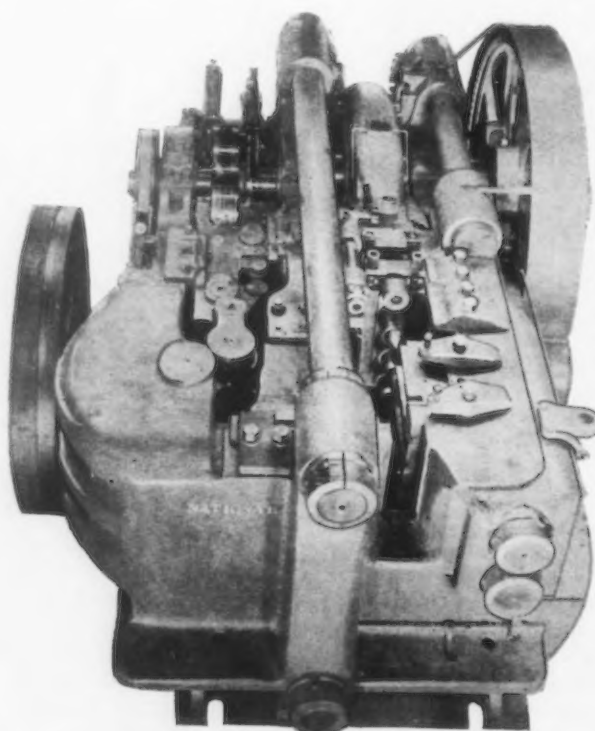


Fig. 12—Horizontal Forging Machine or Bulldozer, Made by the National Machinery Co., Tiffin, Ohio

moved and the forging then can be taken out.

If the movable half of the lower die were operated automatically and the whole drop hammer were laid on its side and the ram operated by a crank motion instead of gravity, there would then be present the essential elements of the modern upsetter. (Fig. 12). Other names are bulldozer and forging machine.

In the operation of such a machine a heated bar is placed in the opening between the two halves of a pair of gripping dies, one of which may be fixed or both may be movable. A foot treadle releases the mechanism. The first movement is that the two halves of the die come together tightly, gripping the bar, and then the ram is forced against the end, upsetting it and also forcing the metal to fill any shaped impression which may be in the gripping dies. The ram then returns and the gripping dies open for the operator to remove the piece.

One Stroke at a Time

Upsetters go through this cycle and stop, and require a second action of the releasing treadle for a second stroke. The gripping dies may have several impressions, one above the other, with a corresponding number of impressions in the ram die, so that by moving the bar from one impression to another successive operations may be carried out with one heating and handling.

The adaptability of this type of forging machine is

very great. In making rings a bar is used which is slightly smaller than the diameter of the hole in the ring. An upset is made which forms the ring (without its hole) on the end of the bar. In the last stage or impression the ram die consists of a plunger which punches the hole in the ring, pushing the whole bar back, leaving the complete ring with no waste metal or flash at all.

Press Forgings

PRESS forgings are made in toggle joint or hydraulic presses using dies in the same general manner as in the drop hammer method, the difference being that a slow push is used instead of the quick, heavy blow of a drop.

One particular feature of this method is that it can make use of a combination of forging and metal extrusion. The lower die may have a hole of any shape in the bottom of its impression, and of greater depth than would be possible in drop hammer work, or the hole may go completely through the die.

A block or cylinder of metal is placed in the impression and, as the press squeezes the metal, it not only fills the impression but it also fills the hole and may go some distance beyond the bottom surface of the bottom die, forming an extruded portion of the same cross section as the hole in the die. Presses are used also for sizing forgings, taking the place of cold striking in a drop hammer.

Rolling Mill Troubles in Spain

TWO plants of the Altos Hornos Co. in Bilbao, Spain, are a little more than a mile apart. Each plant has blast furnaces and coke ovens; one has an old open-hearth department and the other a Bessemer works. Both have rolling mills, one having tin mills. Operation of the plants was described by F. L. Estep of Perin & Marshall, New York, at a recent meeting in Pittsburgh before the Association of Iron and Steel Electrical Engineers.

A new open-hearth plant including three 75-ton furnaces has been located between these two works, which are called Baracaldo and Sestao. It appears to be difficult to serve this new open-hearth department with materials and to get its ingots to the new blooming mill, which was installed something over a year ago. The distance is not great, but they are on different sides of a street and are lined up practically at right angles to each other. The blooming mill, which has rolls 41 in. in diameter, is driven by a German motor with maximum capacity of 18,100 hp., operating at 700 volts. The maximum torque is 1,590,000 ft. lb.

Handling Facilities Generally Inadequate

A new 34½-in. two-high reversing combination rail and structural mill was rolling Bessemer rails from the original heat. Because of trouble in getting steel promptly to the mill, the rate was only 36½ tons an hour. The mill is capable of at least 60 tons, but handling facilities will not permit that speed. Inadequate soaking pits form another handicap.

One difficulty experienced in the finishing mills lies in the large extent to which they are operated by hand. The speaker saw channels of 4¾ in. being rolled in the Sestao plant, taking a great deal of power and using large roll diameters at a speed which is too high for such a section. There are no roller tables on these mills.

Handling troubles were a feature noted also in a 25½-in. motor-driven mill rolling sheet bars from ingots 12 in. square. The work was done by use of a large number of men and the motor was of insufficient capacity

for the last few passes. The author counted 34 men on this mill, outside of the furnace men, and not including those bringing ingots from the furnaces.

Restriction on Tin Plate Output

There are two tin plate plants in Spain. One is at the Sestao works and the other is owned by the Basconia Steel Co. They operate under the same system as in Wales, rolling widths up to a maximum of about 27 in. Labor conditions form a limitation here, as a man will not go beyond a certain pack weight. This figures out at about 27 in. wide and eight sheets of No. 31 gage by some 60 in. long. The pack is made from a single sheet bar ¾ in. thick with beveled edges.

In Spain it is found impossible to get a man to make more in a day's work than the equivalent of 40 base boxes for each mill shift. If they can make that amount in five hours, they shut down the mill and go home, letting the next crew warm the mill up again. This compares with 63 to 65 boxes of the same material made in Wales in 8 hr. on the same method of operation. The management has tried to induce the men, by increasing the scale, to make more boxes. They simply will not do it.

Something of a contrast to the above conditions is found at the mill at Sagunto (described in *THE IRON AGE*, Feb. 17 and 24 and March 10, 1927, pages 494, 571 and 716). The plant includes two blast furnaces, six open-hearth furnaces, a blooming mill, combination rail and structural mill, plate mill and one merchant mill. It is well laid out and is the only plant in Spain which can be extended for increased production at low operating cost without a lot of trouble.

Only the plate mill in this plant is unsatisfactory. It was bought second-hand and has not been used much because its product was not good.

This company is making good rails, but is having trouble in straightening them. The rails are very crooked coming off the cooling bed and the cost of gagging them and getting them straight is said to be high.

Alloys of Chromium and Iron

A Plea for Nomenclature—Definitions Suggested— Types Being Used and Why—Effect of Variations in Chromium

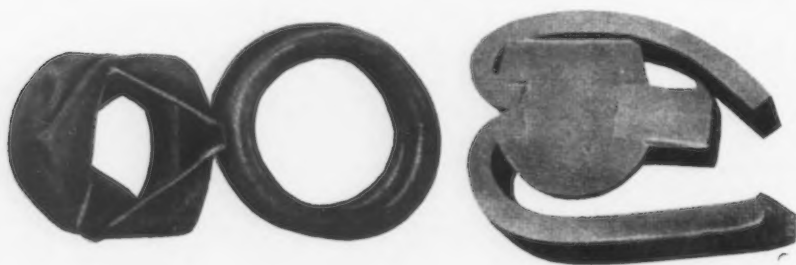
BY T. HOLLAND NELSON*

IT is to be regretted that our various technical societies and steel manufacturers have not as yet got sufficiently close together to agree on standard terms with regard to "stainless iron" and "stainless steel" as they are known to the trade.

A Discussion of the Nomenclature

THOSE quite familiar with the materials will often answer as follows:

Stainless ironunder 0.10 or 0.12 per cent carbon
Stainless steel.....over 0.10 or 0.12 per cent carbon
making no reference whatever to the chromium content.



SOME Seamless Tubing
Made of Stainless Iron,
or Chrome Iron, Showing
Ductility (left). Two plates
of stainless iron riveted to-
gether and then forced apart

This is unfortunate because chromium plays an equally, if not more important, part in certain ranges than does the carbon.

Before discussing analyses let us consider why the term iron is felt warranted at all in conjunction with these alloys. It is because certain of them do not harden (appreciably), and further because they are tough, ductile and capable of general deformation similar, though with modifications, to the manner in which wrought iron or mild steel can be worked. Therefore it is the physical characteristics which are responsible for the terms "stainless steel" or "stainless iron" and not their chemical analysis.

In building chemical equipment, such as ammonia oxidation equipment and absorption towers, it was essential to have a material as malleable as possible, and one which would not harden when heat was applied to local areas. The author has found that under 0.10 or 0.12 per cent carbon is desirable, but more particularly well over 16 per cent of chromium. Silicon and other elements may or may not be very valuable additions according to varying circumstances, all of which require careful consideration. However, it is not my wish to complicate this article by involving other phases.

Material close to 16 per cent chromium can be rather dangerous. At this particular point, a very slight variation might throw the material into either the hardening or the non-hardening group. I happened to be lucky

enough to obtain a heat right on the dividing line which, as will be seen, is still a material which is more symbolic of steel than of iron. (See Table I.)

The series of tests in Table I show that this material still has a tendency to harden by heat treatment. Therefore trouble might be experienced when hot working was involved and where ultimately heat treatment for release of this hardness was impracticable. For instance, rivets driven in the shell of a tower could hardly be heat treated afterwards with any degree of uniformity. Further, if the hot work is done within the tempering range, or below the critical, the maximum corrosion resistance is not obtainable. A tower could not be heat

treated in its entirety without distortion, and local application of a torch, etc., to rivets would produce

Table I.—Analysis and Properties of a Low-Carbon 16 Per Cent Chromium Composition

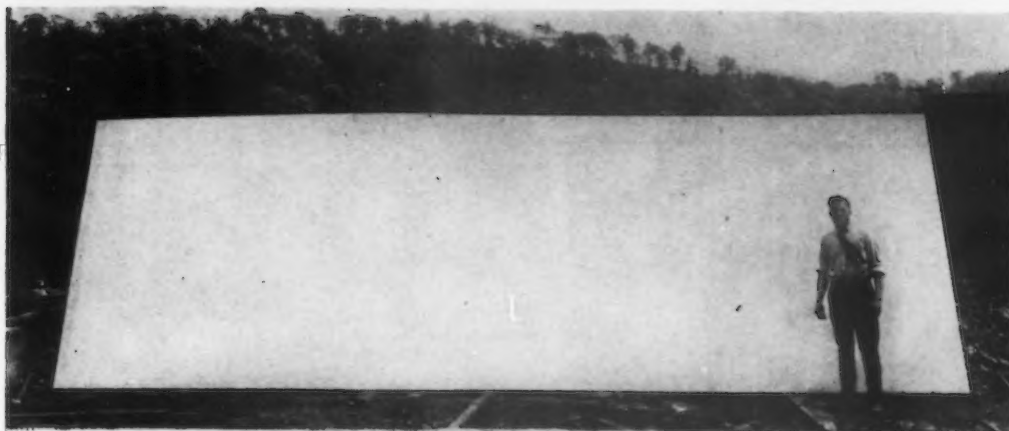
Carbon	0.09	
Manganese	0.35	
Silicon	0.61	
Chromium	16.00	{ Check 15.97% 16.04%

Size of Bar, 1 In. Round.—Water Quenched from 1800 Deg. Fahr. and Tempered as Detailed Below

Treatment	Elastic Limit	Tensile Strength	Elongation	Red. of Area	Impact	Brin.
As rolled	102,000	119,000	18.0	42.0	15	12 250
Water quenched and tempered, deg. Fahr.						
500	132,400	165,200	17.5	39.7	12	12 321
600	130,400	160,700	18.5	45.9	10	10 340
700	133,900	164,700	16.0	52.8	6	5 321
800	134,900	167,100	19.5	54.5	4	5 330
900	135,900	168,100	19.0	51.6	5	4 332
1000	125,800	155,000	19.5	58.3	5	5 321
1050	110,000	130,400	22.0	64.0	19	12 262
1100	96,510	115,700	24.0	65.5	30	30 253
1150	92,000	110,200	24.0	65.5	78	78 228
1200	82,520	108,000	25.5	65.2	62	78 235
1250	81,510	107,500	26.0	66.4	71	94 228
1300	78,300	100,600	27.0	66.6	86	106 207
1350	73,500	99,140	28.5	67.9	101	94 207
1400	71,760	102,600	28.0	68.9	93	104 187
1450	66,700	95,500	30.0	70.0	117	114 179
1500	59,100	89,660	31.0	70.9	60	108 163

It would seem that this material is so close to 16 per cent chromium that, being also on the low margin with regard to silicon and manganese, it still remains a "steel" capable of heat treatment.

*Consulting metallurgist, Widener Building, Philadelphia. This is the second article in a series, the first having been on "Heat and Corrosion-Resistant Alloys," April 25, page 1139.



PROBABLY the Largest Plate of Chrome, or Stainless, Iron, Rolled to Date. Its length is 314 in., width 134 in. and thickness $\frac{3}{8}$ in.

extremely irregular results and tend to loosen up and distort the entire structure.

Type of Chrome Iron Used Extensively

A TYPICAL analysis and the physical properties of a "stainless iron" such as produced in the United States and used in practically all the nitric acid installations built during the last four years, is given in Table II.

It is, however, interesting to note that the physical tests show a marked change between 900 deg. Fahr. and 1,050 deg. Fahr. and again at 1,800 deg. Fahr. The lower temperature changes are particularly interesting in view of the trouble experienced with chrome-iron tubes in oil still work. For it is in this range that prolonged heating at temperature induces serious brittleness in chromium-iron materials. Further, this particular phenomenon is not as pronounced, though it may or may not

exist, over longer time periods and in different temperature ranges in the low-carbon, 11 per cent to 14 per cent chrome steel.

Definitions Suggested.

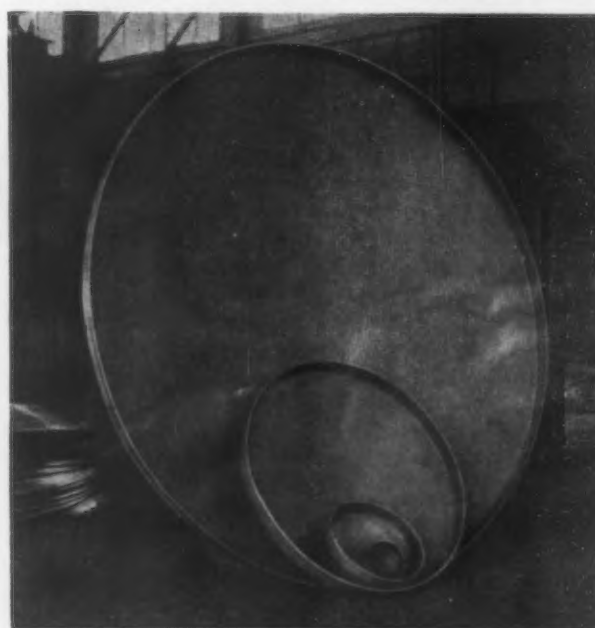
Before leaving this subject, therefore, may I say that my definitions would be:

Stainless Steel.—A material containing under 16 per cent chromium, which will harden by quenching and which further attains a hardness relative to its carbon and chromium content, or that is capable of

Table II.—Analysis and Properties of a "Stainless Iron" Used Extensively in Nitric Acid Installations

Actual Analysis		Per Cent		Range of Analysis, Per Cent	
Carbon	.....	0.09		under 0.12	
Silicon	.....	1.28		0.25 to 1.25	
Manganese	.....	0.35		0.30 to 0.60	
Sulphur	.....	0.015		under 0.025	
Phosphorus	.....	0.016		under 0.025	
Chromium	.....	18.51		16.00 to 19.00	
Size of Bar—1 In. Round:					
Treatment	Elastic Limit	Ult. Tensile Strength	Elongation	Red. of Area	Brin.
As rolled, average of 6 tests	68,000	90,000	25.0	55.09	170
As rolled, reheated and water quenched from 1800 deg. Fahr.	54,000	77,300	36.0	71.4	156
	55,000	77,000	33.0	69.3	149
	58,300	81,000	28.0	63.6	156
	53,300	76,000	35.0	72.5	149
	56,300	79,300	29.0	63.6	156
Tempered as indicated for 30 min. at deg. Fahr.	55,000	78,500	31.0	74.8	156
100	58,300	81,300	28.5	62.4	156
200	56,300	80,000	29.0	63.6	149
300	57,300	81,000	29.0	62.4	152
400	55,000	77,300	37.0	65.9	149
500	54,000	77,300	35.0	70.4	156
600	54,300	78,300	33.0	67.0	156
700	56,000	83,000	29.5	68.2	156
800	55,600	78,800	35.0	71.1	159
900	67,300	81,000	31.5	70.4	183*
1000	56,300	79,000	29.0	68.2	146
1050	56,000	79,000	31.5	67.0	187*
1100	60,000	83,300	30.0	62.4	149
1150	52,300	76,300	36.5	69.3	156
1200	50,000	76,000	37.0	70.4	149
1250	51,000	74,300	37.0	69.3	149
1300	55,000	78,300	32.5	65.9	143
1350	55,000	77,300	32.0	68.2	143
1400	54,300	78,300	28.5	62.4	149
1450	53,300	76,300	34.5	69.3	143
1500	51,000	75,000	64.5	69.3	143
1550	49,300	75,000	36.5	70.4	143
1600	51,000	76,000	38.0	71.4	143
1650	51,000	74,000	37.5	70.4	143
1700	51,000	74,000	37.0	71.4	143
1750	56,000	79,300	25.5	61.0	163
1800	63,300	90,000	8.5	68.5	170

*This latter series of tests shows a metal which behaves substantially like iron.



Some 10-Ft., and Smaller, Flanged and Dished Heads Made of Stainless Iron

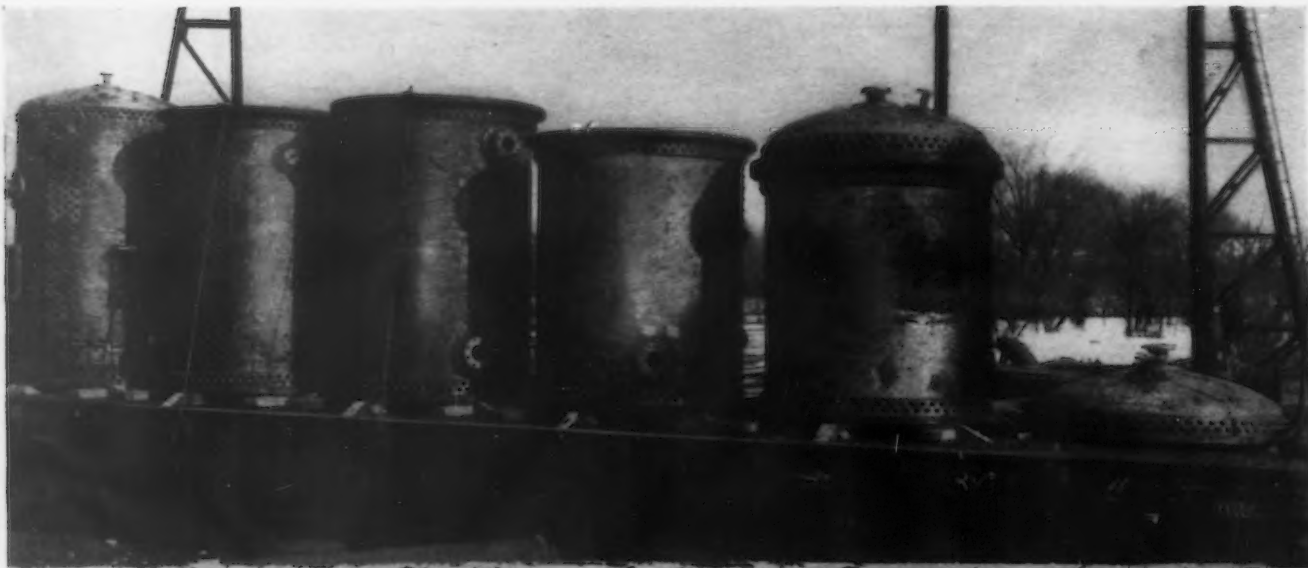
attaining a Brinell hardness of 250 or more by heat treatment.

Stainless Iron.—A material containing over 16 per cent chromium with less than 0.10 or 0.12 per cent carbon which, on quenching, does not harden appreciably, and which will not attain a Brinell hardness of over 200 by heat treatment.

From this material there is no difficulty in obtaining plates, flanged and dished heads, angles, channels, etc. (See Figs. 3, 4, 5, etc.)

Higher Chromium Alloys

THEN we still have left in these straight chrome series a material containing up to 30 per cent chromium, usually 25 to 30 per cent, with carbon usually in the range of 0.15 to 0.30 per cent. This material does not harden on quenching appreciably. However, in the manufacture and working of this material to such



Part of a Chrome-Iron Installation Ready for Shipment

forms as plates, rivets, etc., it acquires substantial mechanical hardness which is not easily released by treatment and, in general fabrication, it is a "stiffer" handling proposition altogether. Moreover in some complicated shapes it is not obtainable.

However, the corrosion resistance of this alloy is extremely high and there are instances where it is far superior to other alloys. To classify this alloy is difficult. If one accepted the carbon basis, it would be a "steel," yet it has more of the general characteristics of iron, and in my opinion it should remain in the iron class (with due qualifications). If we can stretch the term iron to a material with a tensile of 75,000 lb. per sq. in., we can also stretch to 90,000 if the characteristics are similar.

Bearing in mind the foregoing facts, it is not difficult, looking back, to see why material of the low-carbon, intermediate chromium range was adopted for so much of the construction work in the chemical field:

1. It had the necessary corrosion resistance.
2. It was obtainable in all forms required by the fabricator.
3. In the fabricator's hands, without undue complications or elaborate equipment, the material could be formed,

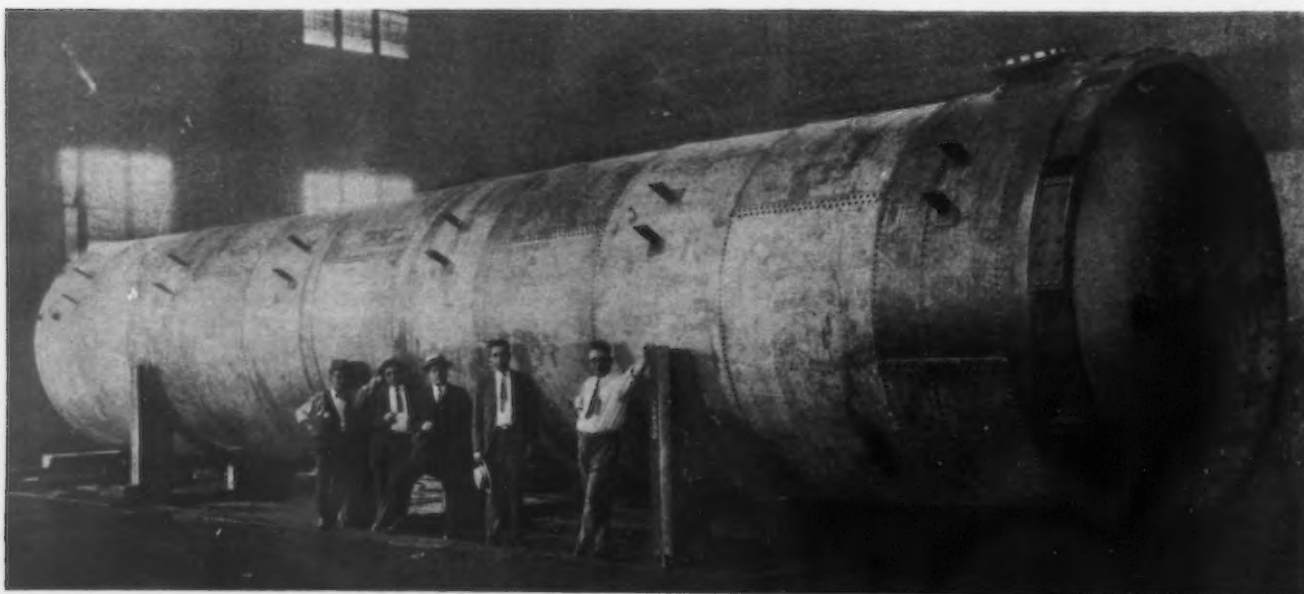
worked, riveted and assembled (with some modifications) substantially in the manner to which he was accustomed.

By this it should not be inferred that fabrication of this alloy was simple. The increased physical properties in themselves called for heavier equipment and considerable care.

The tendency for chrome-iron at temperatures over 1,500 deg. Fahr. to grain growth necessitated all hot work operations to be kept within this range and installation of pyrometric equipment was necessary.

Chemist and Engineer Should Collaborate

Much unnecessary labor and expense could be saved if the chemist usually engaged on testing corrosion resistant materials were given a broader view of the situation. During the author's past experience in this field, so many cases have arisen wherein the chemist, working out of contact with the engineer, has approved the use of a series of materials, all of which, so far as he was concerned, would satisfactorily resist corrosion. Many times it has been necessary, and not always without being suspected of having an ulterior motive, to point out that, while a certain material might have withstood the cor-



One Whole Installation, of Which the Above Photograph Represents a Part, Was Built Entirely from 18 Per Cent Straight Chromium Iron

rosive conditions superior to any others, it was not possible to obtain it in all the shapes and sections that the installation called for.

It is, for instance, a well-known fact that some of the high-silicon cast irons still stand out alone in their general resistance to corrosion, but it is obvious that such a material, not being malleable, is impossible to obtain in the forms necessary to build absorption towers, storage tanks or tank cars. If a word of advice therefore is of any value, my suggestion would be that in all such cases, to save the chemist unnecessary prolonged tests on materials that may ultimately have to be entirely discarded because they are not available, it would seem advisable that in preparing the designs for corrosion resistance installations, the chemist and the designing engineer should be in close cooperation.

In many instances have I known a list containing,



ELBOWS, For Use in Acid Pipe Line, Made of Stainless Iron

CHROME, or Stainless, Iron Annealing Boxes. While the initial cost is high, the increased life and superior work show distinct economy from their use

say, 15 or 20 different materials which were satisfactory to the chemist, which ultimately dwindled down to two or three in which it was possible to obtain all the necessary parts desired. Further, it is sometimes disconcerting and appears to show a lack of due appreciation for careful chemical investigations, when one has to go down a list and mercilessly eliminate materials which are ideal so far as corrosion resistance is concerned.

Before passing from this subject, therefore, it would perhaps be as well to make the general statements that:

1. The higher the chromium content, the greater the corrosion resistance (where iron-chromium alloys are satisfactory).
2. The most mobile material, in the light of present knowledge, to obtain substantial corrosion resistance with sufficient malleability to obtain all structural shapes, is in the range of carbon under 0.12 per cent and chromium between 16 and 20 per cent. (Note: Nickel-chrome alloys will be dealt with separately.)
3. Where high physical properties are required with a substantial corrosion resistance, or in other words, a material capable of heat treatment (hardening and tempering), alloys containing carbon and chromium in ratio to the physical properties desired, but under 16 per cent chromium, and such as mentioned in a previous article, will be found applicable.

Type of Structures

It will be noticed from the illustrations that practically all the structures referred to are of rivetted design, due to the peculiarities of the material itself. I have had the opportunity of inspecting periodically many of the installations built, and find the rivetted structure withstanding corrosive conditions exceptionally well, and can therefore confidently recommend such work. So far, however, as chrome iron is concerned, I do not hesitate to give my frank opinion, and a few reasons, why I feel



Forged Turbine Blades, Made from High Chrome-Silicon Iron, Treated and Bent Cold to Show Ductility

the rivetted structure to be theoretically, as well as practically, the best design. In fairness however, I should like the reader to understand that these remarks apply only to the chromium-iron alloys *not containing nickel*. The nickel-chromium alloys weld much more readily and satisfactorily, and will be dealt with in a separate article.



So far as chromium iron is concerned, welding has been almost entirely abandoned, though many desperate efforts were made by steel manufacturers and fabricators alike to overcome the difficulties encountered in its production, such for instance as special coated rod and certain types of arc or flame. Investigation of the prob-

lem, however, will show how little these items bear upon the real trouble.

For the moment let us glance at the difficulties surrounding the welding of chrome-iron. In the first place, this material when raised to temperatures in excess of 1,500 deg. Fahr., will begin to develop extremely large grain size. This grain growth is always accompanied by brittleness in the material. With this thought in mind, it is not at all difficult to understand that in welding, it is essential in the area of the weld to raise the temperature to that of liquid metal, approximately 2,700 deg. Fahr.

Physical Structure of Welded Chromium Iron

It is just as easily understood that at this high temperature large grains, the size of those to be found in the original cast structure, would be developed. Further, inasmuch as it is not possible to raise an immediate area to this temperature without the adjacent area also becoming heated on a graduated basis, it can be readily understood that there would be around the area of the weld, material possessing varying grain size on a graduated scale according to the temperature it had reached, so that physically the area of welded chrome-iron would be weak.

Many efforts have been made to control this feature without definite success. Certain heat treatments have been devised that would impart some degree of toughness up to the point that one might have felt reasonably safe in using certain structures built by this method of fabrication. Unfortunately, however, the physical weakness of the welded area is not the only deciding factor against welded chrome-irons.

Oxides and blowholes form very readily and it is

practically impossible to weld any extended area of material without including, in some form or other, either an oxide of the metal or some slight non-metallic (slag) inclusions such as would be picked up from the coating of a welding rod.

Such inclusions, together with the actual difference in the physical structure of the area, in comparison with the surrounding mass, have led to two serious causes of attack. Oxides of the metal often dissolve out at such points causing "pitting" or, if not actually soluble, together with non-metallic impurities such inclusions will set up electrolytic action between themselves and the surrounding metal, and have been known to cause deep pitting and even perforation in this manner. This is equally true in some cases of a piece of material which, in one area, had a large grain size adjacent to an area having a normal structure.

For the various reasons mentioned above, welded structure of chromium-iron have so far met with comparatively little success.

If the author has so far attained his object, the reader will now have a general idea of the chemical analysis, physical properties and some of the possible uses and fields for stainless iron and stainless steel in the field of corrosion resistance;—how the chemical analysis not only affects physical properties, but also resistance to attack; and, further, how necessary it is in some cases to concede physical properties on the one hand for resistance to attack on the other or vice versa.

My next article will deal with the nickel-chrome materials, which, although they made their appearance experimentally almost simultaneously with stainless steel, were not perhaps quite as fully understood, and have only comparatively recently come to the forefront, so far as real tonnage is concerned, in this country.

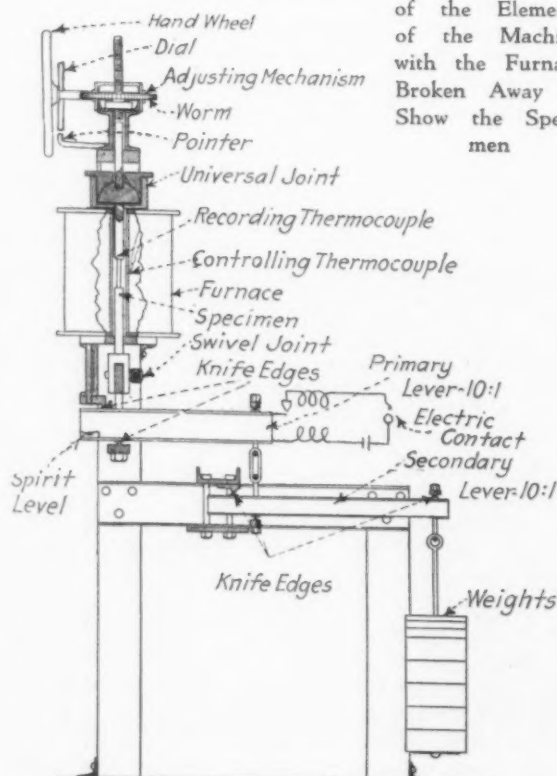
Measuring Creep in Hot Steel Under Load

PHENOMENA of creep—that is to say, slow changes in loaded steel at high temperatures—are matters which have attracted much attention in recent years. Glen D. Bagley, research engineer, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., speaking before the Rochester meeting of the American Society of Mechanical Engineers, May 13, described equipment which is capable of applying any steady load up to 75,000 lb. per sq. in. on a 0.505-in. specimen heated constantly to an accuracy of 2 deg. C. plus or minus, and in which changes of length can be determined to within 0.005 in. per inch without applying measuring devices within the furnace.

A clear idea of the equipment is given in the accompanying cut. The furnace is attached to the upper universal joint, so there is no air circulation through the hot tube. One electrical control is sufficient for a battery of six furnaces; regulation is made from a thermocouple at the winding of the master furnace, which is about 150 deg. hotter than the specimen. Temperatures of the other furnaces are adjusted to be equal to the master furnace by series resistances. A multiple point recorder shows the temperature of each specimen.

Length-measuring devices inside the furnace are eliminated by making a large part of the heated specimen of sufficient size so that its elastic limit could not be exceeded with the load the reduced section can support. Localizing all the creep in the 2-in. reduced section, the actual change in length is related to the amount of turn on the hand wheel necessary to bring the primary lever to its original position (as noted by an electric contact).

S ECTION Through One of the Elements of the Machine with the Furnace Broken Away to Show the Specimen



"Keep Prosperity" Is Keynote

Leaders of American Iron and Steel Institute Urge Restraint
in Selling and Judgment in Plant Expansion—
Gary Medal Bestowed on Farrell

THE chief concern of the iron and steel industry is no longer how to create prosperity, but how to keep it. The unprecedented rate of plant activity was a major topic of both private and public comment at the thirty-fifth general meeting of the American Iron and Steel Institute, held at Hotel Commodore, New York, May 24. Discussion of the business situation on the platform was marked by its unusual candor. Favorable and unfavorable factors were given equal attention; yet not one of the industrial leaders who spoke voiced any apprehension regarding current high money rates.

Foresees Good Business for Rest of Year

In addressing the general meeting Friday morning, James A. Farrell, president of the United States Steel Corporation, said:

"As to the immediate future of the steel industry, I believe that we are going to have very good business all this year."

Charles M. Schwab, president of the institute; Samuel Mather, Pickands, Mather & Co., Cleveland, and John A. Topping, chairman, Republic Iron & Steel Co., were also optimistic regarding the outlook. Mr. Mather said that business is so good that it has even reached down to iron ore in a moderate way and that, if bituminous coal could also get a little stimulus, those who handle primary materials would have no remaining cause for complaint.

Sober judgment governed all that was said about the present state of business, and if there was no mention of the credit stringency, it was not because of any effort to gloss over or hide conditions that threaten to upset prosperity. On the contrary, institute members were warned against the risks of a false feeling of security.

"It is a peculiar quirk of human nature that business men seem to be more cautious of their steps in times of depression than in times of prosperity," said President Schwab, in opening the general meeting. "Yet it seems to me that a time like this is the golden opportunity for industry in general, and for our own industry in particular, to weigh and determine our future course. Certainly we should have the intelligence and the ability, as well as the practical experience, to maintain only those practices and policies that will assure our continuous progress."

"The prosperous condition of our industry must not blind us to the fact that we can be led astray quicker through prosperity than through adversity."

Warn Against Plant Expansion and Selling Pressure

Plain speaking on the part of these leaders, who are preeminently practical men bearing heavy responsibilities to thousands of stockholders and employees, indicated real concern, not about factors outside the industry, but over the possibility of short-sighted action by the makers of iron and steel themselves. Enthusiasm or cupidity that would lead to sharp expansion of plant capacity or to excessive selling pressure would soon undermine present prosperity, in their opinion. Equally disastrous would be any moves that would curtail wages or disturb the satisfactory employment situation now exist-

ing in iron and steel plants. Emphasis was placed by Mr. Farrell on the importance of reasonable steel prices as a stimulus to steel consumption, while Mr. Schwab urged a return sufficient to discount future depletion of iron ore or other raw materials.

Need for Research Stressed

Facts, not theories, actuated their remarks. "It is only by an evaluation of the true economic facts that our industry will make sound progress," said Mr. Schwab in his address. "We have attained astonishing mastery of the art of scientifically producing steel. A big problem in research lies not only in the direction of knowing how to produce better, but also in the direction of knowing how much to produce and where."

"This involves careful analysis of sales results, sales methods, of general business conditions and requirements, and the seeking and encouraging of new uses for our products. It even extends into the field of management and labor relations."

"Research is all-embracing in our modern life. It has made 'rule of thumb' methods obsolete. It means, in a word, finding the basic facts upon which to conduct our business. It is vital to our continued progress."

"While the institute itself cannot conduct actual research as such, it can point a guiding way."

Mr. Schwab did not explain why the institute is barred from undertaking research, and the reason therefor is not clear to those familiar with what has been accomplished by similar associations in expanding the markets for their products, some of them directly competitive with steel.

Scope of Institute's Activities Being Enlarged

President Schwab, however, did point out that the directors of the institute aim to enlarge its service to members. "There is a great field of usefulness open to us," he declared, "and with your interest and support we hope to expand the institute's work in many important directions."

Among new services already undertaken he mentioned the work of the institute's tariff committee, which will give continuing consideration to the complex tariff problem from an industry standpoint. "The lack of public appreciation and indeed of our own intelligent understanding of the industry's tariff requirements in the past have been probably due to the absence of such a service," he added.

Pure Science Must Be Fostered

That the interests of the institute are steadily broadening was apparent to all who attended the meeting at Hotel Commodore. The quest for facts stressed by the president was evident throughout the general and technical sessions, as well as at the dinner in the evening. Dr. Robert A. Millikan, Nobel prize winner and director of the Norman Bridge Laboratory of Physics, Pasadena, Cal., stated that pure science must be kept alive in universities and colleges if applied science in industrial labora-

tories is to progress. "If America cannot lead in science," he said, "it cannot lead in industry."

Dr. Glenn Frank, president of the University of Wisconsin, said that the practical combination of physical science and industrial technology has found its highest expression in the United States. In a scholarly address he sought to foresee the future of machine economy. He compared the advantages and disadvantages of the present machine age, and attributed the more stubborn resistance to its development in the Old World to stronger emotional ties with the traditional past. The two opposite poles of thought on the mechanization of industry, he said, are well represented by Mahatma Gandhi, the Indian philosopher, and Henry Ford, the great American industrialist. But, despite evidences of a struggle between the old and the new, there is nothing to indicate a halt to the march of the machine. Science and technology, said Doctor Frank, are relentlessly extending their sovereignty. We must frankly face the problem of living with the machine.

Pioneer Sins of Machine Age to Be Wiped Out

Machine economy is a mere fledgling in the social systems of history and there is reason to believe that its

pioneer sins will be wiped out. The masses have more to expect from engineers, industrialists and scientists than from social reformers wooing them with panaceas. The great social reforms of the next 50 years, he declared, will come more or less as an automatic by-product of technical advances. Our whole future depends not so much on political statesmen as on industrial statesmen.

Doctor Frank's appraisal of the social implications of the rise of the machine was subjected to an able and thought-provoking criticism by a distinguished visitor from abroad, Marcel Knecht, editor of the *Paris Matin*. He called attention to the fact that those present, many from great distances, came to honor a man, not a machine.

The illustration was not only apt and to the point, but was a graceful and most effective compliment to Mr. Farrell, whose receipt of the first Gary medal from the institute was the impressive ceremony of the evening.

Besides M. Knecht, another noted overseas personage sat at the speakers' table and was introduced to the audience—N. B. Saklatvala, chairman of the Tata Iron & Steel Co., Jamshedpur via Tatanagar, India.

The attendance at the dinner, 1850, exceeded the previous high mark by about 200.

James A. Farrell Urges Moderation in Selling to Prolong Activity

A YEAR ago there was an apparent overcapacity in the country of 10,000,000 tons. The situation today finds us unable, at least from a semi-finished material standpoint, to cope with the demand. Here and there in some of the finished lines there is a little less business than there is in other lines; but after all everything gets back to the ingot, and if we can find uses for the disposition of the raw steel then it really does not matter much whether everything is operating on the same ratio or not.

Reasonable Prices Stimulate Demand

A great many people whom I have talked with believe that the prosperity in the steel industry has been due to a latent demand. I think that the reason the steel industry is prosperous is because we have had some consideration for the consumer of steel, and our prices have been so reasonable that we have stimulated action in practically every line of business in which steel is used.

Here and there there are signs of restlessness on the part of some of the steel manufacturers who think they are paying too large wages.

Fairness to Labor Essential

I want to say, gentlemen, that if we want to break down this prosperity we will break it down by a little honeycombing here and there on the wage scale.

The people in the steel industry, the workers in the steel industry, are not overpaid when you stop to consider the gentlemen basking in the sunshine in the heavens on a scaffolding with an opportunity to smoke a pipe and do something else and receive \$15 a day for five days a week; the man in the mine and the man in the mill are not exactly in that position.

To continue the stabilization of the steel business we must get into our minds that all the customers do not belong to the man who wants to cut the price to get the business. This is plain English; there is nothing oratorical about that remark. I think that we have got to use a little judgment in the steel business if we are going to be prosperous and I think, speaking for myself alone, that this has been the most prosperous year in the annals of the steel business; prosperous for two reasons, first, because we have been able to occupy our mills to capacity and we have had no unemployment in our industry, and,

secondly, because the investors and stockholders in the iron and steel business have had a good return on their investment.

Tariff Recommendations Modest

I want to make reference to one feature of our business that Mr. Schwab talked about. That is the Tariff Committee. I am a member of the Tariff Committee, but I asked to be relieved when a gentleman came to me and insisted upon having a duty of \$40 a ton on bars; I thought that too much for me, although I have been accustomed to dealing with large things. (laughter)

I do not know whether you ought to adopt a general resolution thanking the Finance Committee and the Ways and Means Committee for their magnanimous consideration of the schedule that we presented. I doubt the propriety of that. Yet, after months of work and after dealing with the tariff problem as affecting the iron and steel industry in a scientific way, we get an increase in the duty on pig iron of 37½¢ a ton, and if you look through the rest of the schedule you will find that we are exactly where we started; so I think that we have had wonderful consideration. (laughter)

I do not know what would have happened to me if I had gone down to Washington and asked for an increase in the duties on iron and steel and somebody had said, "Didn't the Steel Corporation earn \$60,000,000 in the first quarter of this year?"

Restraint in Plant Expansion Should Be Equally Shared

Now the prosperity of the steel business has not been confined to the Steel Corporation, but I think, speaking for myself as a member of the United States Steel Corporation, that we have got the best self-abnegation society in the business. In the last five years, by rebuilding a lot of old open-hearths we have increased the capacity 1,700,000 tons; that is, in the last five years, since 1924. In the meantime our other friends here have increased their open-hearth capacity 8,250,000 tons.

Now moratoriums are not a monopoly, and all of this desire to make the production fit the demand is a very laudable thing, but let us have consideration for the general situation as a whole and do not let us think that we are going to maintain the price situation or the tonnage

situation or any other situation that is requisite to prosperity, if this thing is not pretty evenly considered.

Cupidity Greatest Danger to Prosperity

I wanted to say what I am saying now; it was not an inspiration that came to me when I got on my feet. I thought it was about time that something was said urging the people in the industry to have general consideration for each other and keep the production and the new building within reasonable control, having regard also for the fact that sooner or later somebody is going to discover that some of the people in the industry are doing a little work on Sunday—somebody said something about the abolition of the seven-day week, and we have had a lot of credit for it, but here and there the cupidity of the different manufacturers has landed them into a Sunday job

now; and as to eight hours, why, I am going to retire in good order without saying anything more.

Let us spread out this business. Do not let us try to do all the business that we can possibly do in three or four months of the year and have nothing left. The solution of these problems is becoming more simple and easier in this institute by reason of the directorship of Mr. Schwab and the leadership of our former chief, Judge Gary. And above all the disposition of the people of the steel industry, I think, is not bent on selling three tons of steel to a man when he wants only one.

As to the immediate future of the steel industry, I believe that we are going to have a very good business all of this year, but we can save a little of the business if we can spread it out a little bit. Do not try to do it all at one time.

President Schwab Counsels Against Overexpansion of Capacity

THE steel industry is experiencing the greatest demand in its history. It is gratifying to note that during the year 1928 the ingot production for the country exceeded that of any previous year by 6.7 per cent and that production so far this year is at a rate 11.7 per cent higher than it was for the same period last year. With practically all our plants working at capacity, with a large demand assured for some months to come, with the uses of steel increasing in every direction, we have every reason to look confidently into the future.

This prosperous condition of our industry must not blind us to the fact that we can be led astray quicker through prosperity than through adversity. In that respect the record of past experience offers enlightening guidance. Let us avoid becoming self-satisfied.

Counsels Good Judgment in Plans for Expansion

As the expansion of the country's prosperity proceeds, some enlargement of our steel-producing capacity may be required. But never before was it more incumbent upon us to temper our new plans with good judgment, to avoid speculative building, and to profit by the errors and mistakes of the past. We all know that the steel industry has paid dearly for overexpansion in the past, and many industries in this country are still suffering from the same evils forced by the war. Indeed, our own industry has but lately caught up with expansion due to this cause. Nothing causes business depression quicker than endeavoring to produce far in excess of demand.

Our manufacturing facilities, while utilized practically to their full extent at the moment, are far from being unduly strained. May they not yet be capable of still further production? Certainly this is the essential question to be answered now. It is rather astounding that record after record is being broken with substantially the same plant and the same personnel. In this favorable situation we find concrete evidence of the benefits of mechanical development, of the utilization of horsepower, and of the greater efficiency and teamwork of workers and management. Moreover, the consolidations within the industry which have been effected in recent years have had a salutary effect in affording better control, coordination and utilization of existing facilities with consequent benefit to the employees and the consuming public. I cannot emphasize too strongly the fact that the intelligent relating of production to consumption is the most vital and fundamental element in the success of any business.

I should like to appraise our prosperity from another important angle that heretofore has not received the great care which it warrants. Because of the large demand for steel it is generally believed that our industry is in a highly prosperous condition, but we should not allow the optimism caused by this demand to blind us to the serious

economic truth that the earnings on the large investment in the steel business are far from adequate to provide for the industry's future service to the country. Last year the return on investment of companies representing 70 per cent of the industry was 6.35 per cent. Not only in itself, but when compared with what other industries are receiving, this return is indeed very low.

Returns Should Cover Drain on Raw Materials

Moreover, we cannot overlook the fact that the return should be sufficient to cover not merely payment for our manufacturing costs and the activities of labor, and reward invested capital, but also to make up for a huge yearly drain upon raw materials. The steel industry is basic. We are depleting our sources of ore and other raw materials at an enormous rate. The profit in the business, therefore, should be sufficient to compensate for the future expenditures that will be necessary to devise ways and means of replacing these raw materials.

Let me give you the picture as I see it. Take the last four decades from 1890 to date, which represent the real development of the steel business as we know it today. In the 10 years just ending the average annual production of steel ingots will be eight times what it was during the first 10 years of this period. During the first decade from 1890 to 1900, when the industry was just getting under way on a substantial scale, we produced an annual average of 5,900,000 tons. During the next decade, 1900 to 1910, a time of large industrial and railroad development, we produced three times as much, or an annual average of 17,000,000 tons. During the third decade, 1910 to 1920, which included the war years, our production doubled again to an annual average of 33,495,000 tons. In the decade ending this year, characterized by the greatest development of new uses for steel the industry has ever seen, we shall probably reach an annual average of 42,700,000 tons a year as against an average of only 5,900,000 tons at the turn of the century. What this means in terms of raw material at the rate of 4 to 5 tons to 1 ton of ingots makes an appalling figure. In the 40 years we have used five and a half billion tons of raw material. It is not inconceivable that the average annual production of ingots for the next 10-year period will exceed 50,000,000 tons. At this rate the consumption of raw materials will soon reach the staggering total of a quarter of a billion tons a year.

High Wage Scale Should Be Maintained

Desirable and necessary as it is to have our industry adequately reward our stockholders, I am sure that it is equally gratifying to every member of this institute to know that, as our stockholders become better fortified, the maintenance of better wages and living standards for our

workers is also assured. The industry's prosperity better enables us to provide as high wages as are consistent with general economic conditions and with the safeguarding of the investment. According to the National Industrial Conference Board, we are today paying higher wages to labor than most other manufacturing industries, and all of us have come to recognize the great economic importance of maintaining a high wage scale.

Not only are wages at high levels, but employment generally is more stable today than it has been for two years. Industry as a rule is exceptionally free from major labor disturbances. In fact, high wages and steady employment have been accompanied by the development of increasing good-will between employers and employees and greater teamwork than we have ever experienced.

Steel Uses Are Expanding

I am just as optimistic about business today as I have ever been in the past, and that applies with equal force to our industry. I haven't changed my mind on that subject for 40 years. As I look at the development of this business, the extending markets and new applications for its products and the wider contributions which steel is making to the progress of the world in general, I believe that steel has really entered upon a new era of usefulness.

The chief consumers of steel are prosperous. There is no reason to believe that the course of the automobile will be in other than a forward direction. The consumption of steel by the railroads is bound to increase. The use of steel in the construction of small buildings is already increasing at a rapid rate. Steel in household and office furnishings, in farm and factory equipment, in

fact, in all the ordinary activities of life, is being used in innumerable ways, which aggregate a large and increasing tonnage.

Growing Needs of Road Building, Multiple Street Levels and Airplanes

Let me give one simple indication of it. Take the three largest users of steel—automobiles, railroads and building construction. For three years 1925, 1926 and 1927 they took 55.5 per cent of steel consumption. Last year, however, when more steel was used than ever before, their percentage of the total was only 50.5 per cent, which means that new uses for steel took up the difference. It is certainly safe to predict that the requirements of construction will continue to expand, since road building has yet far to go; the demands for bridges and vehicular tunnels are still far from satisfied, while proposals for such structures as multiple street levels to take care of traffic congestion are beginning to approach tangible form. Moreover, airplane manufacture will expand rapidly in the next few years, and it is even conceivable in that respect that we are at the beginning of another industry which may parallel the development of automobile making.

There is a sound economic reason for this vast and growing consumption of steel altogether apart from its generally known and proved qualities. I refer to the salvage value of steel. When it has satisfied its original purpose, there is always the opportunity to utilize the scrapped steel in the production of the new output. In other words, steel has a great reclamation value, which is being more widely recognized as an economic advantage in its use as contrasted with the use of many other materials.

Use of Blast Furnace and Coke Oven Gas in Open-Hearth Furnaces

BY FRANK E. LEAHY

ECONOMICAL use of blast furnace and coke oven gas abroad for use in metallurgical furnaces has attracted attention in this country to use of these fuels to replace coal, producer gas and liquid fuels, more commonly used in operation of metallurgical furnaces. With improved methods of cleaning, blast furnace gas is available for use outside the blast furnace department, either straight or in combination with other fuels richer in heating values, such as coke oven gas, producer gas or liquid fuel.

Blast furnace gas varies in calorific value from 85 to 105 B.t.u. per cu. ft., so that the use of this gas for combustion without preheat of gas, air or both is extremely limited. It, therefore, becomes necessary to consider the quantity of enrichment and preheat necessary for each application, for greatest returns from its use. In most cases changes in design of furnaces will be necessary, so that the efficiencies when changing from one fuel to another will be high.

In districts having no market for its sale, coke oven gas is in the same class as blast furnace gas as a by-product, available to replace any purchasable fuel, such as coal or natural gas. General application of coke oven gas for most heating purposes has progressed rapidly, as the gas possesses qualifications that make its use attractive, either straight or mixed with other fuels.

General Use of Mixed Gas

In some cases it has been found desirable to use a mixed gas of constant heat value of 300 to 350 B.t.u.

This is used to replace the former practice of straight coke oven gas firing. For general purpose work, economies equivalent to coke oven gas only have been obtained with but slight changes in burner and furnace equipment.

This practice does not permit maximum use of blast furnace gas for operations capable of using a fuel of lower heating value. For such applications it becomes necessary to mix the gases at the point of consumption and the desirability of this practice can be seen from the following heat values of mixed gases considered satisfactory for the applications:

Heat Value of Mixed Gas	
Box annealing furnaces.....	200 B.t.u. per cu. ft.
Sheet and pair furnaces.....	250 B.t.u. per cu. ft.
Soaking pits	150 B.t.u. per cu. ft.
Billet heating furnaces.....	350 B.t.u. per cu. ft.
Tin pots	250 B.t.u. per cu. ft.
Open-hearth furnaces ...	250 to 350 B.t.u. per cu. ft.
Coke ovens	100 to 250 B.t.u. per cu. ft.

Specific Applications of Mixed Gas

As mixed gas is available for general replacement use, the first substitutions for other fuels should be where results can be gained at least cost. In general, considering heating requirements, the lower temperature heating furnaces would be the first replacements and the higher temperature furnaces the last.

In the lower temperature range are included all furnaces except welding, melting and open-hearth. General practice today has proved the economic value of such applications. After all heating furnaces have been

supplied, then, if there remain a surplus, the open-hearth furnace can be supplied.

To determine if it is advisable to substitute blast furnace and coke oven gas for another fuel, it is necessary to study present against expected cost. Local conditions will have to be considered, as various factors concerning present equipment and costs must be equated against expected returns. For instance, shutting down a producer plant will relieve direct costs, such as fuel and operating labor, and the fuel and direct expense included in steam, water, power, etc.; but taxes, insurance and part of the supervision cost will have to be carried by the equipment substituted.

[The author goes at some length into calculations of heat available under definite, assumed conditions, and the capital and operating costs involved.]

Open-Hearth Furnace Construction

In construction of the open-hearth furnace, especially designed for blast furnace and coke oven gas firing, careful attention to details will be necessary to secure satisfactory results. Standard type furnaces so successfully used on other fuels can hardly be used for blast furnace gas until important alterations are made in their construction, particularly below floor level.

To prevent leakage of blast furnace gas the checker chambers, if used to preheat the blast furnace gas, will have to be sealed to avoid leakage of the gas through walls and roof. With producer gas the tar and soot carried in help to keep the flues and chambers tight, but with blast furnace gas, which is clean, a gas-tight construction will be necessary.

Use of a gas preheater using waste gases from one checker chamber may be one solution. Blast furnace gas preheated to 1200 deg. Fahr., or higher, in such a preheater and then enriched with cold coke oven gas at the furnace ports is one means of eliminating the gas-tight checker chamber. Both checker chambers would then be used to preheat the air. As the greater the preheat of the blast furnace gas, the higher the percentage of blast furnace gas may be used to obtain a given flame temperature, this plan would require relatively more enrichment than would be necessary if the gas were preheated to 2000 deg. Fahr., or higher.

Open-Hearth Furnace Operation

Of particular interest in the use of mixed gas are the results obtained abroad in use of this fuel in open-hearth furnaces. Frederick Stein mentions the output of two 100-ton and one 150-ton tilting furnaces at United Steel Works at Hoenstrup, producing 30,000 tons of steel a month; life of roof and upper part of furnaces 500 to 600 melts; pig iron in charge, about 20 per cent; heat consumption, including heating up (no work on Sundays) 4,962,500 B.t.u. to the ton. The production includes all sizes of round ingots for pipe making.

The furnaces use mixed gas firing (blast furnace and coke oven gas) delivered at a constant pressure.

Another tilting furnace operation is mentioned operating on mixed gas, also supplied at a uniform pressure. The calorific value of the mixture is approximately 214 B.t.u. per cu. ft. To increase the melting capacity the mixed gas can be enriched by addition of cold coke oven gas. The checker chambers are reinforced and heat insulated. Temperature of each chamber is measured: Average in gas chamber, 2012 deg. Fahr., and air chamber, 2280 deg. Owing to sufficient preheat, the flame is of intense luminosity and has good melting effect.

Flame Temperature

Of particular interest are the flame temperatures which may be obtained from the preheat of blast furnace

gas and the air for combustion. For blast furnace gas higher flame temperatures can be obtained by preheating the gas than the air to the same temperature. A theoretical temperature of 3200 deg. Fahr., can be attained by either preheating the blast furnace gas to 1075 deg. with the air at 60 deg. or preheating the air to 1300 deg. with the blast furnace gas at 60 deg. Therefore, more is to be gained by the preheating of blast furnace gas than of air to the same temperature to attain a given flame temperature.

Examples of Use of Mixed Gases

AS blast furnace gas is produced in practically uniform quantity hour after hour and day after day, its use must be on about the same basis for best results, said E. B. Entwisle, superintendent of the Saucon division, Bethlehem Steel Co., Bethlehem, Pa., in discussing Mr. Leahy's paper. A second consideration in connection with the use of mixed fuels is that the replacement of other fuels should be about in the order of their cost—the most expensive per ton of steel being replaced first. As conditions are today most of the blast furnace gas used outside the blast furnace department is employed for only about 60 per cent of the time. In consequence, much such gas is wasted during the remaining 40 per cent of the time.

Some soaking pits in the Saucon plant, which were designed for combustion of producer gas, are now being operated with a mixture of blast furnace and coke oven gas having a heating value of about 180 B.t.u. for each cu. ft. This is giving excellent results, although the pits were not changed structurally when the change was made in the character of the fuel. Both the air and the gas chambers are used for air regeneration.

Some Difficulties Encountered

Experimental use of this combination of gas has been made in the open-hearth department, but as yet without satisfactory results. This same mixture of 180 B.t.u. heating value was tried in place of producer gas on a furnace designed for the use of producer gas. The result was a lower gas temperature at the port, making slower combustion; and, as the gas was lighter than the producer gas formerly supplied, it burned at a higher level in the laboratory of the furnace and resulted in the rapid destruction of both furnace and regenerators. Inasmuch as the rates of operation in the open-hearth furnace and the blast furnace have not been the same, it was not considered advisable to redesign this open-hearth furnace for the use of blast furnace gas.

A mixing station has been built in the open-hearth department, for coke oven and blast furnace gas. It is possible here to make any desired proportion between these gases, and they have been used in lieu of one producer of the two which formerly were operated on one furnace. The other producer is being run in conjunction with the mixture of coke oven and blast furnace gases.

This combination has been in operation for several months. One complete campaign has been made and the results so far show a satisfactory fuel economy and furnace life. Of all the thermal units employed on this furnace in making steel, from 60 to 65 per cent come from coal; the remaining 40 to 35 per cent come from the mixed gas, which has been used in such proportions that the heating value is about 160 B.t.u. for each cu. ft.

Intermittent Surplus Considered

Inasmuch as coke oven gas has a heating value of about 19,200 B.t.u. in a pound and blast furnace gas only 1200 B.t.u., or a ratio of 16 to 1, some care must be exercised in the proportioning for most satisfactory results, according to A. G. Witting, assistant manager, Gary

works, Illinois Steel Co. We must distinguish clearly also between a continuous surplus and an intermittent surplus of blast furnace gas. This varies with the number of furnaces in the plant. The intermittent surplus for a 10-

furnace plant represents about 9½ per cent of the total surplus. For an 8-furnace plant the intermittent surplus is 12 per cent of the total, and higher percentages are found with plants containing fewer and fewer furnaces.

X-Ray Studies of Cold-Worked Steel

BY F. C. ELDER

IN presenting this paper we have chosen our material so as to give a general picture of the possibilities of the X-ray method in the study of the cold working of steel. The "pinhole method," has been used; X-rays are passed through a series of lead diaphragms each provided with a pinhole, in order to get a beam composed of rays which are parallel. The specimen is mounted directly over the pinhole in the last diaphragm and the photographic plate normal to the beam 2½ in. from the specimen.

All specimens were sections taken parallel to the direction of the cold work and taken along the axis of the wire. Each specimen was carefully ground and polished down to a thickness of 0.006 ± 0.001 in. and, after polishing, etched with acid to remove the grinding and polishing surface.

Figure 1 shows an X-ray photograph of a low carbon (0.08 to 0.10 per cent C.) annealed wire stretched 5 per

A series of photographs were taken of this wire after it had been stretched various increasing amounts. After 15 per cent stretch practically all images have disappeared from the white radiation zone, as well as from the $K\alpha$ and $K\beta$ rings, due to nearly complete fragmentation of the crystals. In addition, we note the first appearance of six cloudy areas in the white radiation zone, with corresponding, although fainter, markings on the $K\beta$ and $K\alpha$ rings. This new characteristic is commonly referred to as "fibering" or preferred orientation, and is brought about by the turning of the crystal units by the cold work so that their (110) planes approach a position normal to the direction of the cold work, that is, normal to the axis of the wire.

These changes in the diffraction pattern progress with the amount of permanent stretch until the wire necks down locally and is practically at the breaking point. Fig. 2 represents the necked portion where its cross section had been reduced by cold stretching 74 per cent.

For comparison photographs were taken of low carbon wires which have been cold drawn through a die. Their similarity to the wires cold stretched equal amounts will at once be evident from comparing Fig. 1 and 2 with Fig. 3 and 4. In spite of the fact that the cold drawing, 74 per cent in Fig. 4, was accomplished, not in a single draft, but in several, the final effect on the crystalline structure seems to be practically identical with that brought about by cold stretching a wire a similar amount but in one operation.

In X-ray photographs of wires drawn 98 and 99½ per cent respectively, the spots denoting preferred orientation cover smaller and smaller areas but grow in intensity as the amount of cold work increases. Additional spots appear which become more pronounced, at least in the $K\beta$ and $K\alpha$ rings. Spots indicative of preferred orientation are visible even on the rings far out beyond the $K\alpha$ ring.

We will show next what changes take place in the pinhole pattern of cold drawn wires when they are annealed at various temperatures, i. e., wire cold drawn 40 per cent and annealed at various temperatures, and wire cold drawn 80 per cent reduction in area and annealed at corresponding temperatures.

An X-ray photograph of a wire cold drawn 40 per cent reduction in area and annealed for one hour in a lead bath at 700 deg. Fahr. appears very similar to that of the wire previous to annealing. In Fig. 5 (annealed at 1000 deg. Fahr.) the spots showing the preferred orientation are growing dimmer and less sharp, quite evidently denoting recrystallization.

All trace of preferred orientation disappears after a 1100 deg. anneal; the structure changes progressively to that indicated by Fig. 6 (annealed at 1400 deg. Fahr.). In the film the images in the white radiation area are becoming more sharply defined, and the sharp images in the $K\alpha$ ring and beyond are increasing in number.

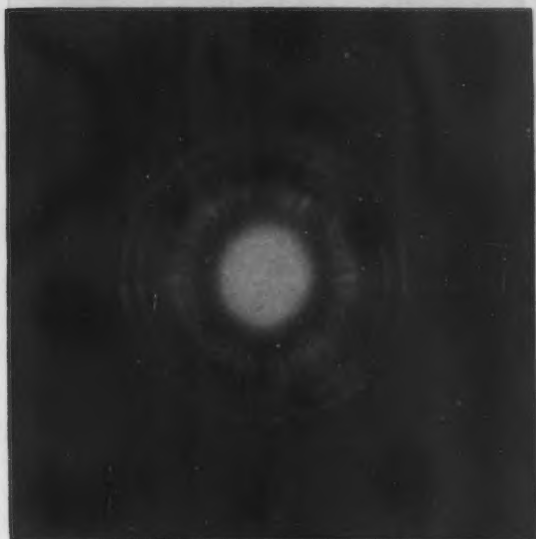
At 1600 deg. Fahr. annealing temperature, there seems to be a partial grain refinement, since although there are still some fairly large images the most of them are much smaller than in the preceding photographs. Also the $K\beta$ and $K\alpha$ lines are commencing to disappear, which

IN 1910, F. C. Elder was graduated from the School of Mines of Columbia University with the degree of metallurgical engineer. Shortly after that he became associated with the American Steel & Wire Co. in its Worcester district. He was transferred to the Cleveland district in 1916, taking charge of the physical laboratory. In 1919 he became chief metallurgist of the company



cent in a tensile machine. The large white circular area in the center of the photographs is produced by rays which passed directly through the specimen practically without diffraction. This area, therefore, gives no information as to the crystalline structure of the metal. The broad annular area surrounding the white bull's eye (known as the "white radiation zone") is produced by short rays diffracted by the crystalline planes in the specimen. [They are so many they overlap and appear as a band of cloudy light in the reproduction.—Editor's note.] Beyond a relatively broad dark area is a narrower ring of spots, a narrow dark area, and then an outer ring of light spots. The inner narrow ring (the first just mentioned) is called the $K\beta$ ring, and is due to diffraction of the X-ray of characteristic wave length from the (110) planes of the tiny iron crystals.

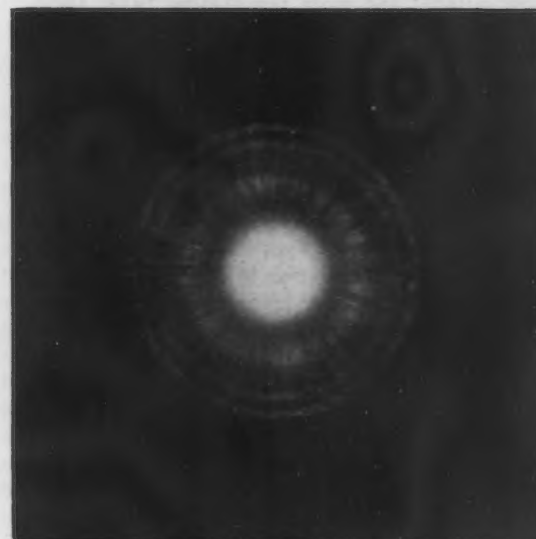
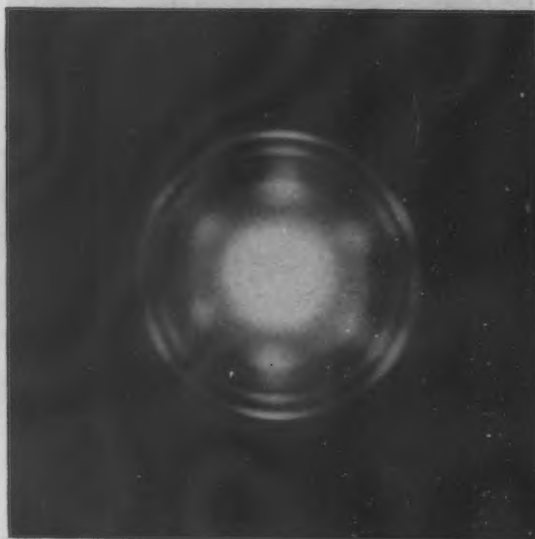
The second ring is caused by the characteristic X-rays called the $K\alpha$ doublet—"doublet" since in reality it is made up of two wavelengths very close together. Still further out from the center are other rings, which are shown only faintly in the original photographs.



* * *

Fig. 1 (left) and
Fig. 2 (right)—
X-Ray Patterns of
Annealed Low
Carbon Steel Wire
After Stretching
Past Yield Point
in a Tension Test-
ing Machine

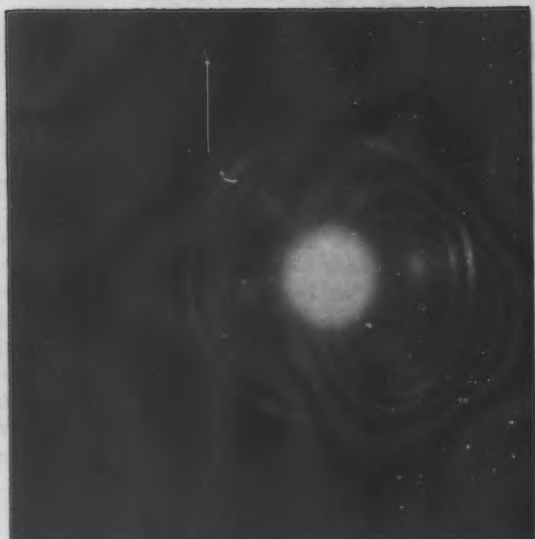
* * *



* * *

Fig. 3 (left) and
Fig. 4 (right)—
These Wires Had
Been Cold Drawn
Through Dies in
Several Stages to
Same Reductions
as Those Immedi-
ately Above (5
and 74 Per Cent
Respectively

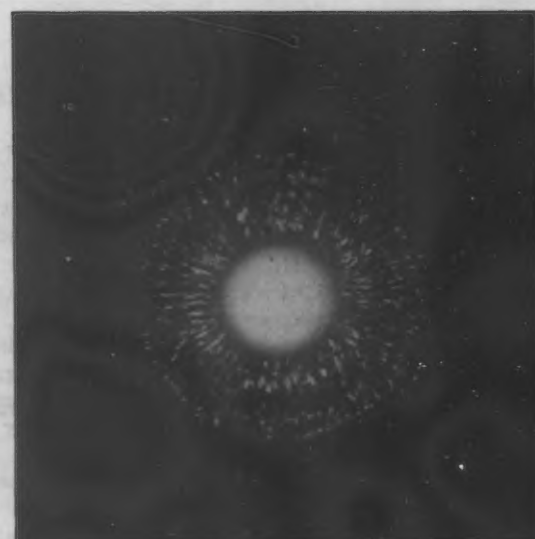
* * *

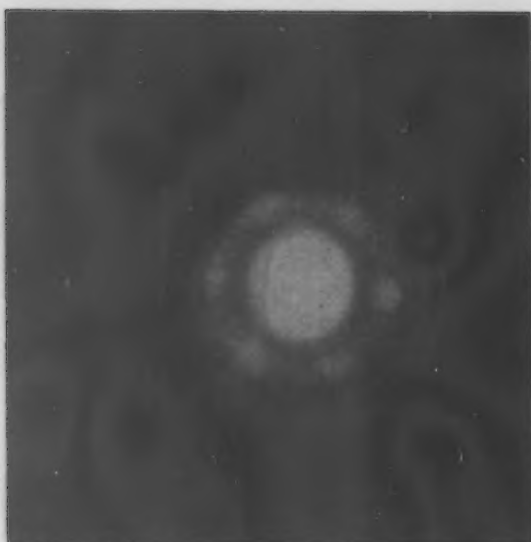


* * *

Fig. 5 (left) and
Fig. 6 (right) Are
X-Ray Patterns of
Wires, Annealed
at 1000 Deg.
Fahr. and at 1400
Deg. Fahr. Re-
spectively, After
Having Been Cold
Drawn 40 Per
Cent

* * *

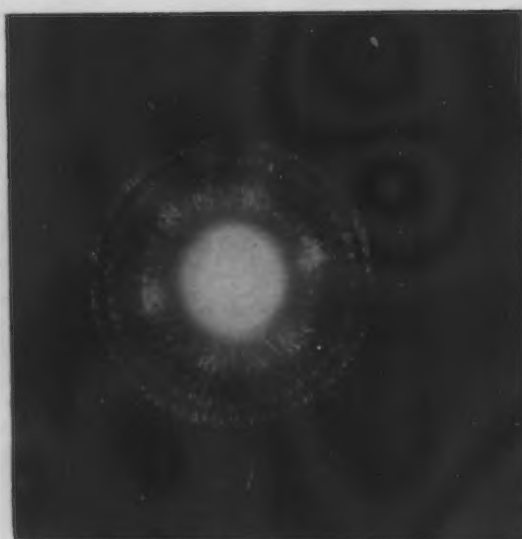




* * *

Figs. 7 and 8 Are Corresponding Views of Wires with Same History as Those of Figs. 5 and 6, Except That Cold Draft Was 80 Per Cent

* * *



probably indicates the approach to a completely random distribution of crystals.

Another series of exposures was made of wire cold drawn 80 per cent and annealed at various temperatures. Comparison of Fig. 7 and 8, of this group, with Fig. 5 and 6 indicates a finer grain, which is to be expected. Recrystallization at 1000 deg. Fahr. has also proceeded much farther, as noted from a greatly increased number of crystal images. Another difference between the 80 per cent and the 40 per cent series is the greater persistency of preferred orientation in the 80 per cent series.

Judging by our X-ray evidence, cold work takes place in two stages. In the first stage, in stretching or cold drawing through a die, the crystals are apparently fragmented. This stage extends up to an amount of cold work equivalent to 10 to 20 per cent reduction in area. We have evidence, although not shown in this paper, that the extent of this first stage depends chiefly on the grain size, that is, the smaller the grain the sooner the appearance of the preferred orientation, which is characteristic of the second stage of cold working. Also we have shown the persistency of the heavily cold worked structure, even after annealing at fairly high temperatures.

Wire-Drawn Structure Very Persistent

IT was pointed out by A. B. Kinzel, Union Carbide & Carbon Research Laboratories, Long Island City, N. Y.,

that Mr. Elder's photographs were made from small ribbons cut from the center of the wires; he questioned whether the preliminary machining had not relieved some of the internal stresses existing in the cold drawn wire of full section. Full-sized wires could, of course, be radiographed by suitable and more penetrating rays; furthermore the conditions at the very surface (a most important region in all spring-wire) could be studied by the reflected rays.

Mr. Kinzel also called attention to the fact that studies in one branch of metallurgy often give light on other branches, distantly related. Thus Mr. Elder's demonstration that the "preferred orientation" induced by cold work is not entirely removed by a simple heating through the critical range (which is supposed to cause complete recrystallization) lends credence to the statement often made by the practical heat treater that if a tool is annealed before it is hardened it will have less tendency to crack during quenching and the toughness of the tempered tool will be greater than though it were hardened without a previous anneal. In other words, while a single heating through the critical range tends to reconstitute the pre-existing crystalline structure, and tends to remove internal strain, and while a second treating brings these effects much nearer completion, nevertheless a multiple heat treatment is doubtless necessary for complete recrystallization.

Molybdenum Steels Make Efficient Permanent Magnets*

IN order to study the effect of carbon and molybdenum on the magnetic properties of iron, two groups of steels have been investigated. These were, first, about 1.47 per cent C with 0.16 to 4.48 per cent Mo, and second, about 2.57 per cent Mo with 0.65 to 1.31 per cent C. They were compared with carbon steel (0.8 per cent) and a normal tungsten magnet steel.

The samples were melted in a crucible, worked down to 16 mm. square sections, heated to 1000 deg. C. and cooled slowly for 24 hr. Pieces 10 x 10 x 200 mm. were hardened by heating in a lead bath, followed by quenching in oil or water.

From the results it was concluded that the best properties are shown by the steel containing 0.9 to 1.07 per cent C and 2 to 2.5 per cent Mo, quenched in water from

800 deg. C. This showed a remanence of 10,680 gaussses and a coercive force of 76 gaussses.

The magnetic properties of such a steel are considerably better than those of the usual chromium and tungsten magnet steels; the decrease in magnetic moment upon aging is nearly the same for both; since molybdenum content is low, the cost will be lower than for the conventional chromium and tungsten steels; and its workability will certainly not be inferior.

The first market guide for Germany to be published in the United States, for the use of American exporters, has been compiled by the American Manufacturers Foreign Credit Insurance Exchange, an association of about 1000 American manufacturers, and was issued to its members May 25, through the American Foreign Credit Underwriters of Chicago and New York.

*Abstract of an article by Stogoff and Messkin, in *Stahl und Eisen*, March 28, pages 429 to 430, by J. M. Gaines, Jr., assistant physical chemist, United States Bureau of Mines Experiment Station, Pittsburgh.

James A. Farrell, First Gary Medalist

SHORTLY after the death of Elbert H. Gary in 1927, the board of directors of the American Iron and Steel Institute (of which Judge Gary had been president continuously since its organization) decided to establish a memorial in the form of a medal which might be awarded annually "For Outstanding Achievement in the Iron and Steel Industry." A committee, consisting of Charles M. Schwab, James A. Campbell, James A. Farrell, Eugene G. Grace and Willis L. King, took the matter in charge, and decided that a work of high artistic and intrinsic value should be secured, in order that the Gary Memorial Medal might be recognized as the most distinguished award in the gift of the American industry. The accepted design is reproduced herewith on a considerably reduced scale.

Paul Manship, the artist, is an American sculptor who has received many honors from various academies, and whose works are prized possessions of the leading museums in the United States. His memorials, medals and fountain groups have given him first rank in contemporary art. His Gary Memorial Medal is an advanced example of that rugged simplicity toward which numismatic design is now tending. The medal itself is unusually massive, 3.75 in. diameter; the face is in such bold relief that the Medallic Art Co., of New York, which cut the die and struck the medal informs us that the blank of coin



JAMES A. FARRELL

gold was struck fifteen times in a 1000-ton press, with an anneal between each squeeze, before the metal had adequately flowed into the deep recesses of the die. Four or five strokes are sufficient for the relief found on ordinary coins and medals.

Mr. Manship's inspiration for the head was a portrait bust and photographs made during the early years of the great war; the rugged contours and determined aspect are characteristic of the man Gary during the most trying period of his business career. The reverse symbolizes the award to an iron master of prowess.

James A. Farrell has been awarded the first Gary Memorial Medal. The citation in the engrossed certificate which accompanies the gold medal and its bronze replica is "For Outstanding, Constructive and Patriotic Achievement." The Institute's Committee on Award is Charles M. Schwab, James A. Campbell, John A. Topping, Willis L. King and Samuel Mather.

James A. Farrell was born in 1863 in New Haven, Conn., the son of a sea-faring father. The father's death forced the 16-year old boy to work; he became a wire-drawer for the New Haven Wire Co. Ten years later, he was sales manager for Pittsburgh Wire Co., and by the time he was 30 he was general manager. His plant, which manufactured rods, wire and nails at Braddock, Pa., was one of those forming the American Steel & Wire Co. Mr. Farrell became the foreign sales manager of the latter organization in 1899, and in 1903 the head of the United States Steel Corporation's export subsidiary. In these positions his inborn instincts and his "infinite capacity for taking pains" came into such good play that the volume of business trebled in ten years. His success as a trader and his qualities as an executive were so notable that he was appointed to succeed William E. Corey as president of the Steel Corporation in 1911. This position he still holds, although late in 1927 he was also designated as the corporation's chief executive officer.



THE Gary Medal, represented three-quarters size, is struck from coin gold, and is the design of Paul Manship, leading American sculptor



Promise Successful Machine Tool Show

Asheville Convention Also Hears Banker, Who Would Determine Comparative Financial Status of the Industry

THE National Machine Tool Builders Association held a meeting at Asheville, N. C., May 20 and 21. It was a large meeting and unexpectedly so, seeing that the industry is especially busy and executives find it difficult to get away from their plants. A three-day program compressed into two together with weather which did not make a loud call for the golf links resulted in somewhat intensive consideration of the problems of specific branches of machine tool manufacture.

In one of the general sessions an outstanding address was made by Alexander Wall, secretary, Robert Morris Associates, Lansdowne, Pa., an organization of banks which compiles records of industrial companies with the purpose of supplying bank credit departments with composite information as to what should be the financial status of a given company in a given group. He explained by means of typical and average unidentified cases in several lines of manufacture how a bank and, for that matter, a manufacturer, could be kept informed in respect to the state of health of the company. An underlying feature of the analyses made from company financial statements is that one may ascertain whether the company is slipping with respect to its group though it may actually show increasing profits. Such a case was cited, and the speaker told how several measures were suggested by the company's bank, any one calculated to keep the company out of the hands of the receivers and put it on the road to stability. A point he emphasized was that the bank's credit man today should not be one armed with a bludgeon, but stand as an official concerned not merely with figures, which were once thought sufficient, but with recommending all conceivable measures to conserve and cooperate with a credit risk.

The machine tool dealers were particularly interested as the address was an introduction to a tabulation of the returns from some 22 members. Figures were given for ten years of such matters as current and fixed assets, variously broken down, and current and funded debt, net worth, etc. They had all been referred to a common size statement, so called, and the sales in dollars per \$100 total assets and the net profits to the same base were basic figures of interest. From these were figured various ratios which serve as indicators of strong or weak positions. For example, these include the common ratio of the current assets to the current

liabilities and such as the following: net worth to total fixed assets, worth to debt, sales to merchandise, or inventory, profits to worth and profits to sales.

The Robert Morris association undertakes to establish the usual relations for all the items for a given industry, so that the bank or the company, as the case may be, may learn where and to what extent the individual company is out of step and needs to take measures to safeguard itself. Considerable stress was laid on the possibility of a company being lulled to negligence or indifference in some particular because it is unaware that it is not maintaining its proper place in the industrial procession. The address was enthusiastically received, including the speaker's request for a fuller response for the current year, his point being he believed what had been gathered for the purposes of his analysis represented truly leading companies so that the average is high and the weaker company, in seeking banking help, will find itself under comparison with the cream of the industry and thus likely to be regarded as more of a credit risk than warranted. In passing, Mr. Wall paid a tribute to the machine tool builders for the losses they sustained in 1921 and yet remained in business even after the lean profits they had to be satisfied with in most of the years since then.

National Machine Tool Builders' Show

The National Machine Tool Builders' Show, to be held in Cleveland Sept. 30 to Oct. 4, was covered in a report to the meeting of the exposition committee. The total amount of space available was sold out, without solicitation, 13 months in advance of the show date, and in spite of practically 50 per cent more space than available in 1927.

The number of exhibitors (including eight companies exhibiting with others) is 242. Of these 160 are machine tool builders, 125 members of the association and 35 not members. Makers of accessories make up most of the remaining 82 exhibitors. The total space available is 91,154 sq. ft. Nearly 81 per cent will be taken by machine tool companies.

The committee acknowledged the cooperation of an advisory committee on the advertising campaign for the show, this committee consisting of F. B. Heitkamp, Cincinnati Milling Machine Co.; H. S. Robinson, Cincinnati Shaper Co.; Walter Rybold, R. K. LeBlond Machine Tool Co., and Payson Blanchard, Bullard Co.

The exposition committee is composed of J. Wallace Carrel, chairman; P. E. Bliss, Warner & Swasey Co.; R. E. Flanders, Jones & Lamson Machine Co.; Robert M. Gaylord, Ingersoll Milling Machine Co., and James E. Gleason, Gleason Works.

Subsequently the meeting went on record as disapproving of excessive entertainment during the show and passed a resolution to that effect with the stipulation that a copy of the resolution be sent to the machine tool dealers' organization. As remarked by General Manager DuBrul, the exposition will cost the exhibitors about \$500,000, or over \$11,000 for each of the 45 hr. it will be in operation, so that maximum use should be made of the show during its operating periods.

Will Standardize Paints on Exhibits

The question of standardizing the color of paint or lacquer given machine tools has made considerable progress, as shown by a brief discussion of the subject by George L. Erwin, Jr., sales manager, Kearney & Trecker Corporation, Milwaukee, and the voting by the meeting of the appointment of a committee to prosecute vigorously the investigation of a standard and report its recommendation as promptly as possible so that widespread adoption may be made of the standard on the machines to be exhibited at the show. Mr. Erwin was made chairman of the committee and the other members are H. W. Dunbar, Norton Co.; William A. Viall, Brown & Sharpe Mfg. Co.; E. J. Fulam, Fellows Gear Shaper Co., and R. S. Alter, American Tool Works Co.

The work of the business paper in modern industry came in for attention in a brief address by F. M. Feiker, managing director, Associated Business Papers, Inc. He described it, among other things, as providing a liquid interchange of ideas, that it was an idea factory, that it represented a tool for transmitting ideas. There are four forces for the making of industrial opinion, to coin a phrase that is the counterpart of public opinion. One of these is the technical and business school; another the government in its relations to business, especially the service relations; a third is the trade and technical association. All three of these are supplemented by the fourth, the business paper.

Going Slow in New Designs

President Henry Buker, who is vice-president of the Brown & Sharpe Mfg. Co., Providence, in his address to the meeting dwelt on practices in the disposal of used machinery, free

engineering service by the machine tool builder and the standardization of machine parts. Speaking of the care that should be exercised before engaging in bringing out a new design, Mr. Buker, among other things, had this to say:

"The cost of drawings, jigs, fixtures and tool work preparatory to manufacturing the machine in many cases will amount to anywhere from \$75,000 to \$100,000. This cost must be absorbed in a very few years if one is to make any money on the new design. The manufacturer may find, however, in looking up his past sales

the designer and the executives in the factory."

Cancellation of Orders

The question of cancellation of orders was discussed by Mr. Buker. "In ordinary times," said he, "the question of cancellation of stock machines is not a very important one. But when the demand for your product is so great that you are promising deliveries months away, it is a most serious problem if, on a declining market, you are to be left with a large stock on your hands. I know that a great percentage of such can-

tomers making inquiries and placing orders at a later date.

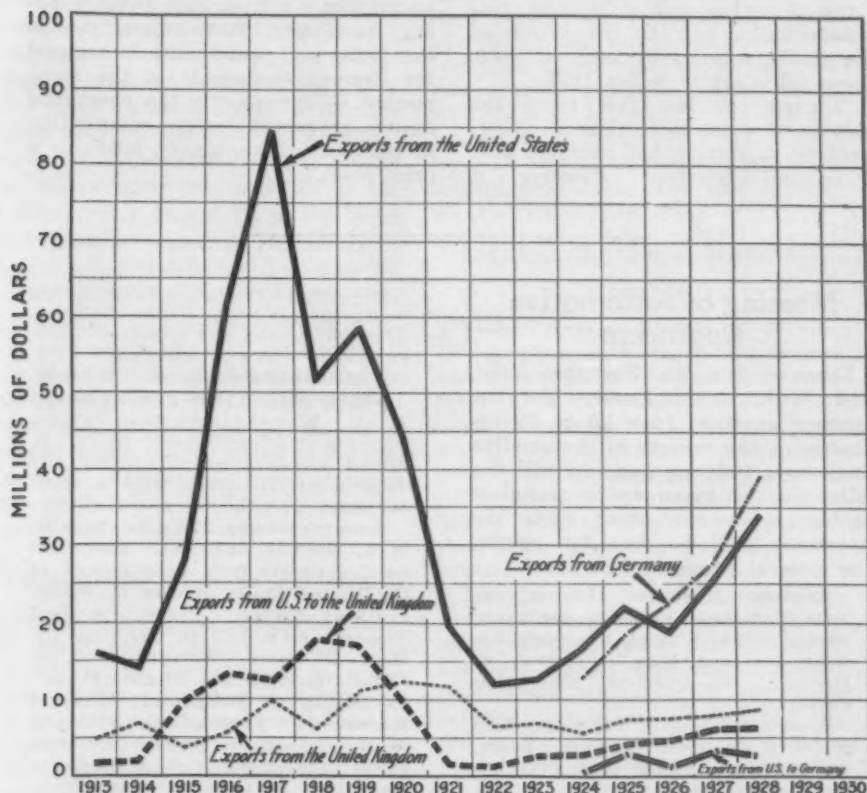
It is made a condition of our acceptance that it is a firm order, and in case of cancellation, we reserve the right to charge 25 per cent of the price of machines as a just compensation to us for such cancellations.

"We also insisted that our customers should acknowledge receipt of this letter as a condition of the terms of sale, and we saw to it that our agents had the same understanding with their customers and with us.

"In the early part of 1920, we commenced to feel that current conditions could not last indefinitely, and having in mind that in the months that some of these orders had been on our books conditions might have changed in our users' plants, we decided to take the matter up with every customer on our books. Under date of March 6, 1920, we sent a letter to customers having orders scheduled for delivery in the future, the substance of this letter being that if, because of changed conditions, they might wish to cancel orders with us, they could do so now without penalty as we could dispose of the machines elsewhere, which might not be the case later.

"Although we had hundreds of machines on order, there were only a few customers who cancelled as a result of our letter. The other customers wrote back stating that they would take the machines as promised. In fact, some hinted that we were trying to obtain their machines in order to sell them to others. Business, as you know, continued to be good for several months longer, but again under date of June 9, we sent a somewhat similar letter to all customers who had ordered machines since March 6, the date of our earlier letter. I think you all know what happened some three months later, in the fall of 1920, when orders for millions of dollars worth of machine tools were cancelled in a very short period. In our own case, however, our cancellation clause and the two letters I have mentioned saved us large sums of money and enabled us to keep our force employed for many months.

"Most of the people who had ordered machines from us, well aware of the fact that they had been given ample opportunity to cancel, took the machines without a word, as they considered them part of their obligations. A few good-sized concerns, however, were inclined to resent enforcement of our cancellation clause, and said they would remember our attitude when business became good and would then show us that we could not enforce a cancellation clause without paying the penalty later. I have two firms clearly in mind, who were extremely disagreeable, and I must confess that I felt we had lost their business for all time. As a matter of fact, when business became good, both concerns came to us and, as far as I am able to ascertain, our relationship with them is just as cordial as in the past. I feel we have



Exports of Metal Working Machinery from the United States, Though Rapidly Expanding in Late Years, Are Exceeded by Those from Germany

for a similar machine, that the demand has been somewhat limited, and that, based on such sales, he would not be warranted in going ahead with the machine. His chief engineer may tell him that this machine possesses such marked advantages over anything else on the market that he will undoubtedly sell many times as many machines of the new design as he did of the old. The sales manager may confirm this opinion, and so sometimes, without actually checking up the market and seeing how many machines are required, the manufacturer goes ahead, spends the money, produces the machine, only to find that if he obtained orders for every possible machine required in the next five years, he could not make a profit on his investment.

"Furthermore, the new design, in going through the shop, interferes with the production of other lines, for practically every new design has some problem of its own that requires close attention on the part of

cancellations can be avoided if a manufacturer will show reasonable foresight in putting this question up to the users when deliveries commence to be distant. I am taking the liberty of citing very briefly our own experience in connection with this problem.

"In March, 1920, we had a very large volume of unfilled orders on our books scheduled to be shipped at periods varying from six to nine months, due to the fact that we had sold out all machines available for earlier deliveries. We were also receiving inquiries from other customers for delivery of machines and on these we were compelled to name even more distant deliveries.

"For many months back we had been using the following form in acknowledging orders:

By accepting your order herewith for delivery at a date somewhat removed from the present, we are making definite arrangements accordingly, and shall give your needs precedence over those of cus-

won their respect. Of one thing I am sure, and that is that they will order from us only machines that they are prepared to take.

"It may be a long time before we experience another depression, but if, in the meantime, you will see to it that your customers are duly impressed with their obligations, and if you gradually build up and strengthen in their minds a proper attitude on this whole question, they will be better prepared to make proper arrangements with you when the crisis does arrive."

Expects No Sudden Change in Business

The report of the general manager of the association, Ernest F. DuBrul, touched on a good many topics of major interest to the industry. These included the state of the industry's business, the effect of the new cutting alloys, the association's index of machine tool orders, standardization, trade ethics and the activity of the association in cost work. Referring to the volume of business, the orders, he said, have been on a higher level for the last three months than for any three months in the last eleven years, except the few months at the peak of the post-war boom.

"The present situation is much more healthy than that boom period was because orders have not reached their present level in a sharp peak. The recent rise in our curve has been quite gradual and decidedly steady. Statistical curves have a peculiarity which all students have noticed time and again. When they show a very sudden rise the fall is equally sudden. So we can judge that the present level is not likely to go off suddenly."

He gave voice to the delivery difficulties occasioned by the shortage of skilled labor in the ranks of the industry, a condition that was increasingly vexing. He offered the suggestion that the machine tool builders might well make a change in their labor policy. The cost of belated deliveries is shown in overtime rates and in the cost of training help, and he believed it well to consider paying higher wages and stop the depletion of plants by bidders for labor. Thus would the builders get their machines in users' hands when wanted.

Exports of Metal Working Machinery

Walter H. Rastall, chief of the industrial machinery division of the Department of Commerce, Washington, addressed the meeting on foreign sales of American machinery. He spoke in part as follows:

"Exports of metal working machinery from the United States during 1928 totaled \$34,125,000, exceeding those for 1927 by \$8,746,000 or 34 per cent, and breaking all records since the abnormal post-war year of 1920. This advance is the more significant when it is considered that the principal markets for this class of machinery are found in the more highly industrialized nations which

are themselves keen competitors of the United States, and indicates strikingly the progress which the latter is making in these highly competitive markets—a strong tribute to American machinery of this type.

"Repeating the experience of last year, the outstanding development in the foreign metal working machinery trade during 1928 has been the sharp gain in exports to Europe, which rose by 41 per cent over 1927. Moreover, in 1928, Europe absorbed over 60 per cent of the total as compared with 57.5 per cent in 1927 and 51.4 per cent in 1926. Sales to Canada and Newfoundland showed a gain of 49 per cent over 1927. Shipments to Latin America and Asia also rose substantially, but the proportion of the total absorbed by both of these areas fell slightly under 1927.

"During the last few years the volume of exports of German metal working machinery has exceeded that from this country. However, it

should be remembered that German shipments include reparations in kind, which account for a very substantial proportion and are a peculiarly difficult form of competition. The French Government passes this machinery on to French industries at a price substantially lower than that which is allowed to the German manufacturer and credited to reparations. Furthermore, in some instances, the French industries purchasing such equipment are allowed credit sometimes running into several years, creating conditions which presumably are beyond the reach of the American manufacturer.

"On the British market, it is not uncommon for American metal working machinery to command double the price per pound that is secured for German equipment in the same market. Consequently the chart and figures represent quality competition in the face of machinery made to a price ideal."

Meeting of Automotive Engineers

Saranac Inn on Saranac Lake, New York, is the location for the summer meeting, June 25 to 28 inclusive, of the Society of Automotive Engineers. Only on June 26 will the entire day be taken up by technical sessions. On the other days the afternoons will be free for sports. The general program follows:

Engineering session, 8.30 p. m., June 25, Norman G. Shidle, chairman. Paper, "What I Think Engineers Are Good For—and How," by Paul G. Hoffman, vice-president, Studebaker Corporation of America.

Combustion session, 9.30 a. m., June 26, W. T. Fishleigh, chairman. Paper, "Combustion-Chamber Design in Theory and Practice," by W. A. Whatmough, consulting engineer, England.

Motor-Truck Design conference, 9.30 a. m., June 26, F. K. Glynn, chairman. Paper, "Extending the Use of Motor Vehicles Beyond the Field of Transportation," by T. C. Smith, engineer, American Telephone & Telegraph Co. This will be followed by a motion picture showing operation of trailers.

Chassis conference, 1.30 p. m., June 26, F. F. Chandler, chairman. Reports on research on head-lighting and on riding qualities, with a progress report from the front-wheel alignment research sub-committee. Paper, "Measurement of Angular Velocities in Automobile Bodies by means of a Gyroscopic Recorder," by Merritt L. Fox, University of Iowa.

A dinner that evening will be devoted to discussion of body problems, under the chairmanship of President W. R. Strickland. There will be a photophone demonstration by Dr. John B. Taylor of the General Electric Co.

Transportation session, 9.30 a. m., June 27, H. F. Fritch, chairman. Paper, "Long Distance Bus Transportation," by R. E. Plimpton, associate editor *Bus Transportation*. Paper, "Science of Business Applied to Motor-Truck Operation," by Nathaniel Mallouf, president, Mallouf Haulage & Maintenance Co.

Mixture-Distribution conference, 9.30 a. m., June 27, O. C. Berry, chairman. This will consist of a round-table discussion at which a considerable number of experts are scheduled to speak.

Airship session, 8.30 p. m., June 27, E. P. Warner, chairman. Paper, "Airship Transportation," by V. R. Jacobs, assistant manager, aeronautic department, Goodyear Tire & Rubber Co.

Research session, 9.30 a. m., June 28, H. L. Horning, chairman. There will be five papers from investigators of the United States Bureau of Standards, as follows: "Cooperative Fuel Research from 1922 to 1929," by Dr. H. C. Dickinson; "Volatility Data on Natural Gasoline and Blended Fuels," by Dr. O. C. Bridgeman; "Present Status of Equilibrium Volatility Work," by Dr. Bridgeman; "Horsepower Correction for Atmospheric Humidity," by Donald Brooks; "Program for Design Factor Engine Acceleration Tests," by Mr. Brooks.

To Discuss Uses of Blast Furnace Gas

Use of blast furnace gas for heating coke ovens and for heating steel plant furnaces will be the subjects for discussion at the annual meeting of the Eastern States Blast Furnace and Coke Oven Association, to be held at the Shannopin Country Club, Pittsburgh, on June 7. Following the dinner in the evening, F. B. Thatcher, assistant general manager, By-Products Coke Corporation, Chicago, will speak on the use of blast furnace gas for coke oven heating, and A. J. Ebner, Freyn Engineering Co., Chicago, on the use of this gas in steel plant furnaces.

Briggs & Turivas, Inc., Blue Island, Ill., has purchased the complete by-product coke plant of the Mayville Iron Co., Mayville, Wis. This plant is being dismantled.

Furnace Control and Steel Quality

Open-Hearth Men Discuss Also Tilting Furnaces, Unusually Large Units with Deep Baths and Recarburizing Agents

QUESTIONS of furnace control, ingot weighing practice, water-cooled furnace parts, recarburizing and scavenging agents, oxides and other inclusions in steel, increasing sizes of furnaces, the value of tilting furnaces, quality of the scrap charged and methods of avoiding steel imperfections were among the topics taken up in detail at the meeting, May 16 and 17, in the Hotel Cleveland, at Cleveland, of the open-hearth committee of the American Institute of Mining and Metallurgical Engineers. These items, which were not covered in the first instalment of the story of the meeting, carried in our columns last week, pages 1419 to 1421, are to be found in the paragraphs which follow. Some of the material on refractories, most of which was published in the May 23 issue, is incorporated here.

Maintaining Sloping Backwalls

FOUR sloping backwalls in one plant were reported to take 7800 lb. of chrome ore a week to maintain. In these furnaces the roofs are 10 in. lower at the backwall than in front. One man said that the corners at the ports cut out rapidly; he uses metal-cased brick in this position.

Sloping backwalls were reported by one operator as very satisfactory, as he has eliminated all backwall delays through their use. The height of the backwall to skewback has been made the same as at the front, because he found, under the earlier practice, that he was losing roofs too soon. Under the skewbacks is a 12-in. vertical section, made of chrome brick.

Others expressed favorable opinions of the sloping backwall, but in some cases reported either port or roof trouble. A plant using oil fuel, with a little coke oven gas, made an average run of 311 heats in 1928, with sloping backwalls. Two furnaces so equipped in one plant are running on gas and oil respectively, the latter just installed. The gas furnace made 375 heats on its first run with the new backwall, and was subject to no additional repairs.

Maintenance of the backwalls on this gas-fired furnace was said to be no higher than for the slag lines of straight furnaces. With oil there is a bit more trouble, perhaps on ac-

count of the way the burners are located. But the speaker thinks this may be overcome and make the oil-fired furnace as good for this type of wall as that using gas.

Another man reported a bit more roof trouble with the sloping backwall than with straight. He has 60-ton furnaces from which he is tapping as high as 95 to 100 tons, using a very deep bath. The roof span is 15 ft., with a 22-in. rise.

Automatic Temperature Control

DRRAFT control apparatus, in conjunction with waste-heat boilers and a damper in the breeching were reported to leave always plenty of draft in reserve, in a steel castings plant. Use of pyrometers and thermocouples in studying the operating conditions led one operator to establish a definite 25-min. reversal period, from beginning to end of the heat.

Two furnaces now under construction are being fitted with an automatic valve. There is a tie-up of air and gas valves and stack damper here which will make it impossible for the furnaceman to actuate any one of the three without moving the others also. They will all be set on the basis of scientific study of what should be best operating conditions. All gas and all air will be measured, air being forced in and the draft and temperature measured. The stacks are 225 ft. high and 8 ft. in inside diameter.

Infiltration will be stopped in this furnace by means of insulation. There will be no arbitrary reversal period. But there will be incorporated the most up-to-date methods for burning mixed gases. The speaker sees great economy to be had along this line, and thinks that its use should be greatly extended. He believes that his new furnaces will permit him to improve the quality of his steel.

Reversal of furnace valves at an arbitrarily set temperature was reported by one man. This is accomplished with the aid of pyrometers placed in the outgoing flues from the checkers.

Efficient Burning of Fuel

HIGH-PRESSURE coke oven gas, used to atomize tar, was suggested as a means to better fuel efficiency. About 100 lb. pressure is

needed for this purpose, and it was said to be impossible to get above 20 or 25 lb.

Against this inability to compress this gas were cited the numerous natural gas lines operating at 100 to 700 lb. A new one, from the Monroe field to St. Louis, is said to be designed for a pressure of 400 lb. to the square inch. One speaker expressed the view that the higher pressure is bound to come in furnace work.

Stack Dampers for Furnace Control

SETTING a damper at a height of 18 in. at the beginning of a run, one operating man said that it is raised gradually until at the end of the run it is at 30 in. It is operated by hand, with the aid of a ratchet, and is not difficult to handle. In another case an electrically-operated damper is used, whereby the stack draft is regulated consistently as required. This speaker voiced the opinion that stack dampers have been unduly neglected in furnace construction and operation. They should be easy to move; properly used, they will give better life to the furnace and better fuel costs.

It is a matter of educating the furnacemen in the proper use of stack dampers, and of consistent follow-up. His five-furnace shop was first started with two furnaces operating. He and his assistant showed the men just how the best results could be obtained with the dampers. They "sold" the idea to the men and, as a result, were able to get them to use the dampers intelligently. As furnace after furnace was added to the operating list the same procedure was followed. And when two more furnaces were built the whole seven came into the practice of watching the stack dampers and regulating the furnace partly by their use.

With the damper in some plants is a recorder to show what it has been doing. The plant is in business primarily to make good steel; steam from the waste-heat boilers must get along as best it can. It is merely a by-product, anyway.

Automatic control of the damper on one furnace was said to be working well. The damper is raised or lowered as conditions change. It is located between the reversing valve and the stack damper. Two such dampers in another plant are low-

ered at the end of the heat, over the bottom-making time, and result in saving fuel. The flues and checkers are kept hot by this means.

Heavier draft during the melting period is taken care of in one case by setting the damper at 0.6 in. gage for that work and then changing to 0.5 in. during refining.

Three-Piece Door Frames

FOR the most part such installations of three-piece door frames as have been made have been in use too short a time to allow definite opinions to be formed regarding their utility. In one case, however, they have been in for five years and are well liked. One furnace, which has had them about 18 months, has had the life of the front wall increased by 30 to 40 per cent.

That they afford a larger opening for the charging of scrap was adduced in their favor. One plant was mentioned in which the top member replaces the skewback above the doors, giving 6 in. more of opening. They are said to occasion no trouble with the roof, even while charging. One man who tried them, but could not continue because his water is so hard that they were filling with lime and burning out, said that the cooling of these frames does not slow down the making of heats.

Slab Buckstays vs. Structural or Water-Cooled

IN a plant using all three types of buckstays—slab, structural and water-cooled—the slabs are preferred as they seem easier to keep in shape. Using slabs 6 x 15 in. in section, one plant reported no change of shape in five years. With the structural type the inner flange gradually burns off and in two years the buckstay has taken a bow shape. As it is customary to space the slabs farther apart from the structural buckstays, this gives the brick masons a better chance to get at the furnace in rebuilding.

One plant found, on using 12-in. H-beams, that, in time, they warped. In this case 4 x 4-in. channels were welded in on each side, as shown in the sketch, making vertical water spaces. This worked out very well, and no more warping has been experienced.

Buckstays 5 x 15 in. are used in two forms in one plant. For sloping backwalls they are the solid slabs; for straight backwalls they are laminated, being made of heavy plates. Cast steel buckstays were abandoned at one plant because the water spaces filled up with mud.

Trend in Sizes of New Furnaces

TAPPING capacities for new furnaces came in for some discussion. Those who have used large furnaces were unanimous in their belief that they are the thing to use. One man said that he saw no prac-

tical limit to size, other than capacity of auxiliaries to handle the product. So far as ladles and ladle cranes are concerned, this is already partly solved by the bifurcated spout, whereby one furnace can tap into two ladles at once.

New furnaces building or contemplated were reported as follows:

One of 130 tons, with hearth 16 x 41 ft., building.

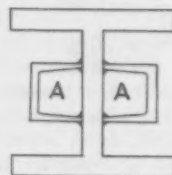
Two of 200 tons contemplated, with hearth 15½ x 42 ft., and bath 4 ft. deep.

Eight of 150 tons, with hearth 16 x 50 ft., 30 in. deep.

Several of 150 tons, with 16 x 50-ft. hearths, and bath 36 in. deep.

Slag Removal from Slag Pockets

CONCRETE busters, dynamite and various other agents were reported as in use in taking slag from slag pockets at the end of a run. In



Section of H-Beam Buckstay with Channels Welded on at AA for Water Cooling

some cases water is sprayed in for 12 or 15 hr., to crack up the slag deposit. But one plant had to discontinue using water in this manner, because the steam had a tendency to disintegrate the brickwork of the furnace uptakes.

Two plants reported using a loose, temporary flooring in the bottom of the slag pocket. In one case this consists of 18 in. of sand, with loose bricks forming a wall lining on both sides of the pocket. These bricks are pulled out and the sand is dug out after the run, thus making it possible to pull the slag out without damaging the permanent walls. The other plant uses old clay tile underneath the sand bottom, and breaks these tile as the first step in getting at the slag deposit. A steel slab is then inserted as a bar to pry the slag loose, using the crane to pull on the end of the slab.

Practice in Weighing Ingots

MOST of the plants represented weigh their ingots in some manner. Usually the buggies of ingots, stripped, are weighed on their way to the soaking pits, and the light weight taken as the buggies come back. If a stool or two be missing, the weight is known accurately enough to permit an estimate. Pit loss is customarily estimated. One

plant uses 1.8 per cent, and another 2 per cent, for this item.

Plate mills have to pour ingots to definite heights for making plates of various sizes. Hence they both estimate and weigh their ingots. One plant weighs the ingots in the molds, having already the weight of the drag of empty molds. Weighing stripped ingots is done in groups, varying from six to 30 ingots at a time.

Automatic scale weighing of ingots between soaking pit and blooming mill is practised at one plant. In figuring the open-hearth yield from these weights, the soaking pit loss is estimated at 2 per cent.

Quality Product from Tilting Furnaces

NO definite champion of the tilting furnace was present. Several men who had had experience with them, however, said that they possess distinct advantages. They make it possible to get better elimination of both phosphorus and sulphur through the expedient of flushing off the early slags. They make it easier to repair slag lines during the progress of a heat, as the furnace can be rolled in either direction, the bad spot uncovered and the hole patched.

Limestone and scrap may be put in immediately after the tapping of the previous heat, thus saving many thermal units. The bottom may then be made, while the early charge is heating up, preparatory to melting. One man who has one tilting furnace said he has only one-fourth as much bottom trouble in that furnace as in the others. But he said that it is difficult to handle in a tilter the heavy slag of an alloy steel heat.

A representative of the United States Bureau of Mines has been making tests of steel made in some large tilting furnaces. The material is for blanks for seamless tubes, and the quality is such that rejections have been consistently below 3 per cent. He said that this steel does not look so good in the ladle, but that it tests out satisfactorily.

Effect of Extra Deep Bath on Quality

NO difference, in the opinion of a superintendent who operates furnaces of several sizes, is to be found in quality between steel coming from a moderately large furnace and that from another which has a bath a foot deeper. There seemed to be a difference of opinion among those present as to what constitutes a deep bath. Some thought of 36 in. as average, while others put anything over 24 in. in the deep list.

One man making plate steel reported more defects in that coming from 120-ton furnaces than in that from 50-ton units. But the steel from the larger and deeper baths tests out just as well as the other. A steel foundry operator said that he has been charging 35-ton heats in the

(Continued on page 1539)

Scrap Industry Adopts Business Code

Elimination of Unfair Practices Aim of Conference Held
Under Auspices of Federal Trade Commission

THE elimination of unfair practices in the scrap iron industry, the setting up of a code of business practice which would have teeth in it and the establishment of a foundation of co-operation with consumers and producers of scrap were the purposes of a trade practice conference of the scrap iron and steel industry held at the William Penn Hotel, Pittsburgh, on May 23.

Thirteen resolutions or rules of business practice were adopted. The resolutions covered "top dressing" of cars, defamation of competitors, misrepresenting price quotations, failure to fill orders, interference with contracts, commercial bribery, overbilling of cars, fictitious bills of lading, arbitration, cost accounting, compliance with rules and overweights.

G. S. Ferguson, commissioner of the Federal Trade Commission, presided and was assisted by M. M. Flannery, director of the trade practice division of the commission. About 200 dealers, representing most of the large scrap iron firms of the country and approximately 90 per cent of the tonnage shipped by the industry, were present.

Blames Ills on "Lack of Mutuality"

In outlining the purposes of the conference, Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel, Inc., New York, traced the conditions now existent between dealers and consumers of scrap to "the lack of mutuality" between the two groups.

"Under this heading of lack of mutuality," said Mr. Schwartz, "may be put direct dealing between consumer and producer of scrap. This tendency, if it continues, may jeopardize the assets and the investment of a very important industry in American life. It may diminish the ability of that industry to render service to industrial America and to render service to the national welfare in time of peace and in time of national emergency.

"It seems to me that direct dealing and the practices growing out of it are a matter of as great concern to the steel industry as to the scrap iron industry. There are consumers of scrap who may find themselves unable to compete in the sale of finished steel products when faced with strong reciprocal arrangements covering scrap, which in the final analysis amounts to a rebate in price. There are many consumers of scrap who may find themselves embarrassed, or may experience difficulty in securing the

vital service from the dealers from whom they have expected to receive their necessary raw material, if the dealers' ability to serve is diminished or restricted.

"Furthermore, it is known that for every ton of scrap gathered, prepared and shipped to the ultimate consumer, approximately two tons of iron ore and three tons of other valuable raw materials are conserved for future generations. It is therefore a matter of interest to the national welfare, which has been served, and served well, by an industry which occupies a very important part in the national policy of the conservation of natural resources. It is hoped that out of this and subsequent conferences there will develop that mutuality which is lacking and without which no business relationship can be profitable. It is also hoped that there will grow up a machinery of cooperation between consumers and dealers, based on a recognition of the services rendered, and further based on a recognition that that service is charged with a national interest."

The resolutions adopted are as follows:

"Top-Dressing" of Cars

Delivery of an inferior product against a contract to supply scrap iron and steel according to certain specifications by so arranging the shipment in the car that the inferior product or products will not be readily discovered on surface inspection, the effect of which is to deceive the purchaser as to the grade of scrap, is hereby condemned as an unfair method of competition, an unfair trade practice and contrary to the public interest.

Defamation of Competitors

The defamation of a competitor, by any acts, or by making, causing or permitting to be made or published any false or untrue statement, which impugns the business integrity, the ability to perform contracts, or the credit standing of such competitor, is hereby declared an unfair method of competition.

Price Quotations

Circularizing the industry with price quotations, containing indefinite language, or offering prices which appear to be above the general market in any territory, the intent of which is not to pay such prices, but is to offer bait to prospective customers, and the effect of which is to demoralize the market within those territories, and disrupt normal, competitive conditions, is hereby declared an unfair trade practice.

Failure to Fill Orders

The intentional failure to fulfill orders or contracts, except for the act of God, public enemy or other unavoidable causes,

or causes beyond human control, is hereby declared an unfair trade practice.

Interference with Contracts

Wilfully inducing or attempting to induce the breach of an existing contract by any means or device whatsoever, during the term of such contract, or interfering or attempting to interfere with the performance of any contractual duty or service connected therewith, such breach or interference being for the purpose or with the effect of dissipating, destroying or appropriating in whole, or in part, the patronage, property or business of another engaged in such industry, is hereby declared an unfair method of competition.

Commercial Bribery

Commercial bribery, whatever the form and wherever given, is hereby declared an unfair trade practice, an unfair method of competition and contrary to the public interest.

Overbilling of Cars

The wilful overbilling of shipments is hereby declared an unfair trade practice.

Fictitious Bills of Lading

The presentation or use of fictitious bills of lading or other evidence of billing, for the purpose of securing advances of money or other valuable consideration, is hereby declared an unfair trade practice.

Arbitration

The industry hereby expresses its approval of the arbitration of disputes among dealers and/or brokers, as preferable at all times to litigation with its costly handicaps and delays, and it is the judgment of this conference that arbitration of disputes, under the rules of a recognized code, formulated for the industry, should be encouraged as a good trade practice.

Cost Accounting

It is the judgment of this industry that an accurate knowledge of costs is indispensable to intelligent and fair competition, and the general adoption of correct and uniform methods of costs as a means of correcting various unfair practices heretofore mentioned, is strongly recommended as a good trade practice.

Overweights

Failure of dealers or brokers to give credit for overweights, where credit for overweights has been passed by the consumer, is hereby declared an unfair trade practice.

Compliance with Rules

Whereas, compliance with these rules is essentially a matter for the industry itself, and

Whereas, it is desirable that outside agencies of enforcement should be used as a last resort and that violations be adjusted expeditiously and without notoriety within the industry, therefore be it

Resolved, that it is the sense of this conference that all violations of these

rules be referred in the first instance to the Institute of Scrap Iron and Steel, Inc., for investigation and adjustment.

Continuation of Conference

Resolved, that this conference of the scrap iron and steel industry be continued as a permanent conference for the suppression of unfair practices and that the executive committee of the Institute of Scrap Iron & Steel, Inc., shall cause to be selected a committee or committees to investigate alleged violations of these resolutions and to make complaints of such violations to the Federal Trade Commission, and if deemed advisable such committee or committees may request the Federal Trade Commission, from time to time, to call new conferences of the industry for the purpose of amending these resolutions, and

Resolved further, that such committee be authorized to send its accredited representatives from time to time to make such investigations or inspection as may be necessary to determine whether the resolutions adopted by this conference are being observed in letter and in spirit.

Sees Beginning of New Era

At the banquet in the evening which was tendered to the visiting dealers by the Pittsburgh chapter of the institute, Mr. Schwartz again emphasized the far-reaching importance of the conference to the scrap iron industry. He stated that the day's proceedings might well be taken as the beginning of a new era in the business and this opinion was shared by other speakers, who included Joseph G. Hitner, Philadelphia, president of the institute; Charles Dreifus, president of the Pittsburgh chapter; Harrison Nesbit, president, Bank of Pittsburgh, N. A., and Mr. Ferguson and Mr. Flannery of the Federal Trade Commission.

Alloys of Iron Research Partly Financed

Resolutions were passed by Engineering Foundation at its triennial meeting held in New York, May 23, to accept the offers received from Battelle Memorial Institute, Columbus, Ohio, and United States Bureau of Standards, Washington, to cooperate with the Foundation in its alloys of iron research.

This research was proposed some time ago by the American Institute of Mining and Metallurgical Engineers. It was decided that a comprehensive and critical review of the existing literature concerning the various equilibrium systems of iron and the other metals, and the known physical properties of the alloys of pure iron would be a necessary preliminary to researches in plant or laboratory, in order to avoid duplication of work. Such a review is estimated to cost \$150,000 and to require five years.

For this preliminary work Battelle Memorial Institute now donates \$50,000 and the Bureau of Standards contributes services of its staff to the value of \$5,000, conditioned on the completion of financing and commencement of work by Jan. 1, 1930.

Prof. George B. Waterhouse, of Massachusetts Institute of Technology, has been appointed chairman of the committee which will assume active direction of the research. A. C. Dinkley, president Midvale Co., is chairman of the ways and means committee for this research, and reports that negotiations for subscriptions with some 125 American firms have resulted in many promises of aid.

It was also announced that the Society of Naval Architects and Marine Engineers, which has a research endowment of about \$100,000, is planning to utilize the income from this fund to support appropriate investigations sponsored by Engineering Foundation, thus enabling the society to participate usefully in major projects.

H. W. Craver, librarian, Engineering Societies Library, has received an offer of \$50,000 from James H. McGraw, chairman, McGraw-Hill Publishing Co., to extend the usefulness of the library as the directors shall vote.

New officers of Engineering Foundation include H. Hobart Porter, chairman. Alfred D. Flinn remains as director.

Objectives of Industrial Furnace Association

The Industrial Furnace Manufacturers Association, at a recent meeting, adopted the following as the objectives of its organization:

To promote and further the interests of industrial furnace equipment manufacturers in their engineering, manufacturing, sales, patents and other industrial problems.

To collect and disseminate information of value to its members for the purpose of attaining improved production, proper use and increased distribution of industrial furnaces.

To increase the amount and improve the quality of industrial furnaces in industry.

To appear for its members before the legislative committees, governmental bureaus and other bodies in regard to matters affecting the industry.

Iron and Steel Electrical Engineers to Meet

A five-day convention, with an iron and steel exposition, will be held by the Association of Iron and Steel Electrical Engineers at the William Penn Hotel, Pittsburgh, June 17 to 21 inclusive. The inspection trip, which will take place on the afternoon of June 20, will be to the Aliquippa plant of the Jones & Laughlin Steel Corporation.

Various sessions are devoted to topics of separate divisions of the association. The electrical engineering division will have the floor on the morning of June 17. The safety engineering division has its session that afternoon. The electrical engineering

division comes in again on the morning of June 18 with a paper, "Anti-Friction Bearings for Mill-Type Motors," being a report of the sub-committee on bearings. Electric heating and electrical developments in the iron and steel industry will follow, each being a committee report.

Combustion engineering will have separate sessions on the mornings of June 18, June 19 and June 20. Simultaneous sessions of the electrical engineering division on those mornings will take up other topics. A paper on "Selection of Electric Drives" will be presented June 19; and one on "Portable Electric Tools" and a discussion of "Methods of Best Utilizing Electrification in the Steel Industry" on June 20.

Suggestions of Employees Save Money for Company

Methods employed by the Crompton & Knowles Loom Works, Worcester, Mass., in obtaining suggestions from employees are described by John F. Tinsley, vice-president and general manager, in an article in the Executives Service Bulletin, published by the Metropolitan Life Insurance Co. The Crompton & Knowles Loom Works for several years has conducted organized committee work among its employees, covering equipment, materials, working conditions, quality of production, elimination of waste and miscellaneous activities.

In the equipment group the plant has three committees, one on tools, another on machine efficiency and a third on patterns. In the materials group committees cover wood, pressed steel and drop forgings. Four committees deal with working conditions, one each on labor relations, shop safety, shop activities and educational courses. On production and elimination of waste, separate committees deal with disposition of scrap, fuel conservation and elimination of waste. Other committees have to do with purchasing, transportation and shop suggestions.

"Some idea of the value of this work in our company," said Mr. Tinsley, "may be obtained from the fact that our committees have handled in nine years upward of 5000 ideas, suggestions and projects, and have completed over 90 per cent of them." Mr. Tinsley said that one committee initiated a saving amounting to \$26,000 a year.

Convention of Refractories Institute Postponed

The annual meeting of the American Refractories Institute, which was to have been held at Green Brier, Ind., on May 21 and 22, has been postponed until June 25, and will be held at the Keystone Athletic Club, Pittsburgh. Dorothy A. Texter, 2218 Oliver Building, Pittsburgh, is secretary.

Steel Warehouses Are Prospering

Generally Satisfactory Conditions Revealed at Convention
of American Steel and Heavy Hardware Association

CONDITIONS in the steel warehousing business were declared to be the most satisfactory in three years by officers and members of the American Steel and Heavy Hardware Association, which held its twentieth annual convention at the Washington Hotel, Washington, May 21, 22 and 23. Some disturbing influences still exist, it was said, such as imports along the seaboard, direct mill competition and allowances of discounts, but it was the opinion of the convention that problems of mill competition and discount allowances are being solved by closer cooperation within the warehousing industry itself and with the mills. Such cooperation, it was urged, should be increased.

An address by M. Markham Flannery, director of the trade conference division, Federal Trade Commission, emphasized the value of Government cooperation in the elimination of unfair methods of competition. Mr. Flannery explained the trade practice conference idea as it has been worked out in a number of industries. A committee of the American Steel and Heavy Hardware Association commended the work of such conferences. A motion was adopted favoring the trade practice conference for the steel warehousing industry.

Legislation in favor of resale price maintenance was strongly indorsed by the association's legislative committee. The convention voted unanimous approval of the committee's indorsement. Representative M. Clyde Kelly of Pennsylvania, one of the authors of the Kelly-Capper price standardization bill, told the association that such legislation would benefit both sellers and consumers.

A. J. Lockwood Elected President

Officers were elected as follows: President, A. J. Lockwood, Edgar T. Ward's Sons Co., Newark, N. J.; first vice-president, R. H. Sanderson, Cutter, Wood & Sanderson Co., Cambridge, Mass.; second vice-president, W. J. Holliday, W. J. Holliday & Co., Indianapolis; executive committee, Guy P. Bible, Horace T. Potts & Co., Philadelphia, three years; C. P. Rogers, Beals, McCarthy & Rogers, Inc., Buffalo, three years; A. R. Purdy, A. R. Purdy Co., Inc., New York, two years; L. H. Williams, Williams Hardware Co., Minneapolis, one year.

The place and time of the next annual conference were left to the executive committee. Places suggested included Atlantic City, Cleveland, Pittsburgh and Chicago.

Resolutions in memory of the late George F. Blake, George F. Blake &



A. J. LOCKWOOD
New President of American Steel
and Heavy Hardware Association

Co.; F. H. McIsaac, Lamson & Sessions Co., Cleveland, and E. J. McCarthy, Beals, McCarthy & Rogers, Inc., were read by G. M. Congdon, Congdon & Carpenter Co.

Says Jobber's Value Is Established

In his opening remarks, President H. A. Sadler, Sioux City Iron Co., Sioux City, Iowa, told members of the association that it is their duty to counteract influences at work against the jobbers. It was pointed out that the jobbers' value has become firmly established both as distributors for the mills and in serving consumers desiring quick deliveries. The activity of steel warehouses during the past year was said to have been the greatest in several years.

Mr. Lockwood, chairman of the executive committee, reviewed the work of the committee and complimented members who had brought about accomplishments in behalf of the association.

Activities of the association and conditions in the industry were outlined by B. R. Sackett, secretary-treasurer, Philadelphia, in his annual report. He declared that steel buyers are turning to the warehouse in increasing numbers for finished materials. The general prosperous condition of the steel industry and warehouses was recited and the outlook was said to be favorable. Reports from members show, he said, that they are charging interest on accounts past due with good results, bringing about a reduction in the number of

such accounts. Buying and selling standards, advocated by the National Association of Purchasing Agents to curb losses and encourage better methods and practices, were said to be proving a factor in efficiency and in establishing closer relations between buyers and consumers. Direct competition with mills was said to be a demoralizing influence, and Mr. Sackett stated that merchandising experts and the Federal Government have conceded that the warehouse is an essential and economical factor in the system of distribution. Price cutting was mentioned as still being a serious problem, adversely affecting profits.

Margins on Bolts, Nuts and Nails Are Approved

Indorsement of the wire and nail and Graham nut and bolt plans regarding margins was given by R. H. Welton, Chase, Parker & Co., Boston, in submitting the report of the adequate margins committee. The report declared that mills should not compete against distributors, but that common problems should be solved in joint conference. Low profit lines listed included twist drills, hacksaw blades, etc., and the situation was attributed to competition among manufacturers and selfishness among warehouses.

The cost of doing business committee, headed by A. L. Philbrick, the Congdon & Carpenter Co., Providence, R. I., presented a statement covering the percentages of costs by districts for 1928 and 1927 and for all districts for the period 1923-1928, inclusive. The gross profits for all districts for 1928 and 1927 were 25.77 and 25.34 per cent, respectively; total expense, 25.30 and 23.93; turnover, 3 and 3.17; per cent of returned merchandise to sales, 2.10 and 2.41. These figures covered reports from 34 members for each of the two years.

Upon motion of F. J. McNeive, the convention decided upon the appointment of a committee of three to work with the Metal Branch of the National Hardware Association and a committee representing the sheet mills to consider the question of mixed carload shipments with a view to improving existing conditions which control such shipments.

Warehouse Business Conditions Good

The report of the iron and steel committee, submitted through its acting chairman, G. K. Conant, Sligo Iron Store Co., urged the necessity of warehouses developing trade among buyers who are not purchasing direct from the mills. The report showed

that warehouse business conditions generally are good, and in a number of instances better than they have been for the past three years. Among the disturbing conditions mentioned are importations; lack of proper relationship between warehouses and mills and between warehouses and customers and among the warehouses themselves. It was declared that there is no reason why the warehouses cannot adopt proper policies for improving the situation. Unfair trade practices, it was stated, can be handled best through trade practice conferences with the Federal Trade Commission. In discussing the report, E. Mck. Froment, Froment & Co., said that imports of bar steel are affecting the market. T. C. Potts, Horace T. Potts & Co., urged closer work between the warehouses and mills, each caring for its own business.

The cold finished steel committee, through its chairman, Mr. Lockwood, recited the great growth of the industry, modern processes developed in production, the large output of alloy steel, and progress made by different committees on engineering, etc., in bringing about improvements in the industry.

Upholds Price Maintenance Legislation

Representative Kelly vigorously upheld resale price maintenance for nationally advertised and trade-marked goods. He insisted that it is necessary if business of the country is to be conducted on a sound and safe basis for all concerned, including the manufacturer, distributor and consumer. Price cutting was bitterly assailed. Continuance of the present system for 10 years more with the growth of chain store systems and combinations, it was predicted, will bring about Government supervision, which, it was said, would be disastrous. At some length he discussed the report of the Federal Trade Commission on resale price maintenance. He urged the members of the convention to study the report carefully and to educate the people to the importance of passing the bill, which, it was said, will be reintroduced at the December session.

The report and the proposed legislation were analyzed in a report of the legislative committee submitted by Mr. Orr. It was said that interest in the legislation is growing. The committee strongly favored the legislation and the conference in a vote unanimously went on record in favor of it. Mr. Orr suggested that the members take the matter up with their representatives and senators.

Appealing to members of the convention to take a more active interest in politics and public affairs and to urge others to do so as well, Oliver B. Surpless, Surpless, Dunn & Co., Inc., New York, in a spirited address on "The Rapidly Rising Trend of Taxation," said that in the face of the fact that practically all taxes are collected from business interests, the surprising condition obtains that very few business men show even a slight in-

terest in matters of taxation and rarely can a business man explain in an intelligent manner how and where his tax money is spent.

Accomplishments of simplified practice in reducing costs and the great possibilities that still lie ahead in this direction were told in an illustrated talk on "Simplification and Better Net Profits" by Ray M. Hudson, assistant director, Bureau of Standards. Simplified practice, he said, means reducing variety in sizes, dimensions, types, models, patterns, etc., to eliminate waste in manufacturing, selling and purchasing. Jobbers, it was declared, like others, find simplified practice helps them to simplify stocks, cut investments, get quicker turnover, give better service and do more business.

May Hold Trade Practice Conference

The report of the trade practice conference committee was read by Mr. Froment, who outlined the purposes of trade practice conferences held with the Federal Trade Commission, and upon motion of Mr. Orr it was voted to appoint a committee to

make a report regarding a trade practice conference relating to warehousing steel. The committee will report to the executive committee and advisory board which was empowered to arrange for a trade practice conference if it is deemed advisable.

The Graham plan was strongly endorsed in a report of the bolt and nut committee, presented by its chairman, William E. Hansen, Hansen & Yorke Co., New York. It was pointed out, however, that members have not in some cases taken full advantage of the plan, which was said to have been the salvation of the industry. Manufacturers, it was held, have not been quite fair to warehouses with which some continue to compete. Jobbers were said to be distributing only 17 per cent of the bolt and nut output. Reports from 31 districts showed that 75 per cent of the members are participating in the Graham plan. The report emphasized the importance of the plan in arousing "group thinking." In the discussion the hope was expressed that the plan would be extended to other lines.

Purchasing Agents to Meet at Buffalo

The fourteenth annual convention and "informashow" of the National Association of Purchasing Agents will be held at Hotel Statler, Buffalo, June 3 to 6. At a general convention session on the morning of June 3 the following addresses will be made:

"The Federal Trade Commission's Attitude Toward Business," by Hon. William E. Humphrey, member, Federal Trade Commission, Washington.

"Simplification and the Purchasing Agent," by Ray M. Hudson, assistant director, United States Bureau of Standards, Washington.

"Stock Market and Commodity Prices," by Leroy D. Peavey, president, Babson Statistical Organization, Wellesley Hills, Mass.

In the afternoon a meeting of the iron and steel committee will listen to the following papers:

"Standardization of Gages," by A. P. Hickcox, purchasing agent, Scovill Mfg. Co., Waterbury, Conn.

"Shall Color Marking of Steel Be Standardized?" by L. B. Case, secretary, metallurgical sub-committee, General Motors Corporation, Detroit.

"Extras on Cold-Rolled Strip Steel," by R. C. Todd, assistant general sales manager, American Rolling Mill Co., Middletown, Ohio, (tentative).

At a session of the standardization committee on Monday afternoon George A. Cooper, division of simplified practice, Department of Commerce, Washington, will discuss the "Work Program of the Standardization Committee."

The iron and steel session on the morning of June 4 will be featured by an address on "The Iron and Steel Situation," by H. N. McGill, president, McGill Commodity Service, Inc., Auburndale, Mass. The same speaker will discuss the "Use of Charts and

Graphs in the Study of Products and Prices" at the general convention session in the afternoon.

Practical Talk on Nitriding

Prof. Victor C. Homerberg, Massachusetts Institute of Technology, addressed the Hartford Chapter of the American Society for Steel Treating, May 14, on the nitriding process. He said that most of the steel used for this process in America contains 1.5 per cent Cr, 0.20 per cent Mo, and 1.0 to 1.25 per cent Al. It is sold under the trade-name Nitralloy in three carbon ranges namely 0.10 to 0.20 per cent, 0.20 to 0.30 per cent and 0.30 to 0.50 per cent.

In spite of the high aluminum content, he said, these steels are produced without segregation or streaks. The trick is in the manner by which the aluminum is introduced: An alloy FeAl₃ is used as the addition agent, producing little or no Al₂O₃ to be entrapped in the steel. Nickel-chromium or chromium-iron alloys are recommended for furnace parts. Nickel plate is used as a stop-off where soft spots are desired on the work. Nickel tubes are used for introducing the ammonia gas into the container and also for the exhaust. Nickel wire mesh is used in the box for supporting the work.

"Foreman Training Plans" is the title of a 60-page brochure issued by Metropolitan Life Insurance Co., New York, which reviews the systems used in 20 or more manufacturing companies. It contains details of the methods, such as group organization, courses of study, and subjects for group conferences. It will be mailed free upon request.

Live Topics Before Testing Engineers

Symposium on Cast Iron a Feature of Atlantic City Meeting Sessions on Steel and Non-Ferrous Metals

A FEATURE of the technical program of the annual convention of the American Society for Testing Materials at Atlantic City, N. J., June 24 to 28, is a symposium on cast iron. This is scheduled for Tuesday evening, June 25. Preceding the regular symposium there will be reports of two committees, one on specifications for cast iron pipe and another from the regular committee A-3 on cast iron.

Symposium on Cast Iron

The symposium itself, which has been arranged to bring to the attention of the engineering profession the physical properties of cast iron, with particular reference to the various grades, will be covered by the following speakers on the topics assigned, all leaders in the gray iron industry:

"Classification of Properties of Cast Iron," by J. W. Bolton; "Effect of Section and Various Compositions on Physical Properties of Cast Iron," by R. S. MacPherran; "Correlation of Test Bar and Casting," by W. H. Rother and V. M. Mazurik; "Static Strength of Plain and Alloy Cast Iron," by F. B. Coyle; "Elastic Properties of Cast Iron," by J. T. MacKenzie; "The Fatigue Properties of Cast Iron," by J. B. Kommers; "Impact Value of Cast Iron," by Hyman Bornstein; "Wear Testing of Cast Iron," by A. L. Boegehold; "Machineability of Cast Iron," by E. J. Lowry; "Corrosion of Cast Iron," by H. O. Forrest, and "Heat Treatment of Cast Iron," by F. B. Coyle.

Topics at Other Sessions

At the first session on Tuesday afternoon, June 25, the convention will be opened by remarks by the president, G. W. Thompson, reports of committee E-6 on papers and publications, and committee E-5 on standing committees, followed by the announcement of the election of officers and their introduction. The tentative program of other sessions, during the week, on metals and alloys is as follows:

Tuesday afternoon.—Nomenclature, Research and Methods of Testing:

"The Determination and Significance of the Proportional Limit in the Testing of Metals," by R. L. Templin.

"Tension, Bend and Impact Tests on Reinforcing Bars," by W. A. Slater. Reports of committees E-8, E-9, and E-1.

Wednesday morning.—Steel and Wrought Iron:

"Reduction from Steel Ingot to Forging," by L. H. Fry.

Report of research committee on yield point of structural steel, and of joint committee on investigation of the effect of phosphorus and sulphur in steel.

Report of sectional committee on standardization of dimensions and material of wrought iron and wrought steel pipe and tubing.

Report of joint research committee

of A. S. M. E. and A. S. T. M. on effect of temperature on the properties of metals.

Report of research committee on effect of arsenic and tin on high-speed tool steel.

Reports of committees A-9, A-2, A-6, A-8, A-10 and of A-1 on steel. Thursday morning.—Corrosion and Fatigue of Metals:

"A Critical Study of the A. S. T. M. Corrosion Data on Commercial Steel," by V. V. Kendall and E. S. Taylerson.

"A Method of Treating Data on the Lives of Ferrous Materials," by R. F. Passano and Anson Hayes.

"Corrosion of Metals Under Stress," by D. J. McAdam, Jr.

"Fatigue Tests on Specimens of Large Diameter with Special Reference to Welds," by R. E. Peterson.

"Influence of Corrosion Accelerators and Inhibitors on Fatigue of Ferrous Metals," by F. N. Speller, I. B. McCorkle and P. F. Mumma.

Reports of committees A-5, B-3 and of sectional committees on zinc coating of iron and steel and of the research committee on fatigue of metals.

Two Sessions on Non-Ferrous Metals

Two sessions on non-ferrous metals are scheduled for Thursday evening and Friday morning, at which the following papers are to be presented:

"Life Tests on Metallic Resistor Materials for Electrical Heating," by F. E. Bash and J. W. Harsch; "Aluminum Alloys for Pressure Die Castings," by Sam Tour; "Fatigue Data on Some Aluminum Alloys," by J. B. Johnson and T. T. Oberg; "Effect of Corrosion Accompanied by Stress on the Tensile Properties of Sheet Duralumin," by H. S. Rawdon; "Physical Properties and Methods of Test for Some Sheet Non-Ferrous Metals," by J. R. Townsend, W. A. Straw and C. H. Davis; "Fatigue Studies of Non-Ferrous Sheet Metals," by J. R. Townsend and C. H. Greenall; "Hardness Relationships and Physical Properties of Some Copper Alloys," by C. H. Davis and E. L. Munson; "An X-Ray Study of Copper Which Showed Directional Properties on Cupping," by Arthur Phillips and Gerald Edmunds, and "Bearing Bronzes with and without Zinc," by H. J. French and E. M. Staples.

Marburg Lecturer and Dudley Medalists

The fourth Edgar Marburg Lecture will be delivered Wednesday, June 26, at 4 p. m., by Dr. Saul Dushman. His subject is "The Nature of Cohesive Forces in Solids." Doctor Dushman is assistant director of the research laboratory, General Electric Co., Schenectady, N. Y.

Recipients, this year, of the Charles B. Dudley medal are J. J. Kanter and L. W. Spring. Both are with the Crane Co., Chicago. The award is made for the authors' paper, presented at the annual meeting of the society in 1928, entitled "Long-Time" or "Flow" Tests of Carbon Steels at Various Temperatures with Particu-

lar Reference to Stresses Below the Proportional Limit."

The annual meeting and the report of the executive committee is scheduled for Wednesday evening, June 26, followed by an informal dance and smoker.

Profits Essential to Healthy State of Business

The corporation that is not making a profit is a menace to a healthy continuation of business, declared Charles F. Abbott, executive director of the American Institute of Steel Construction, in an address May 22 at the annual meeting of the Newark Foundrymen's Association, Newark, N. J. Mr. Abbott insisted that we have been giving more attention to volume and not enough to production costs, and if this continues for long there will threaten an unusual number of failures.

Unfortunately, in face of the high record in active demand for goods, prices and profits have not always been in proportion. The problem in nearly all industries is not a lack of business, but the failure to maintain prices that include a reasonable profit.

The shifting of economic factors during the past few years has brought about unusual conditions. New problems have been created that have called for cooperative organizations in order that the interests of each industry might be safeguarded. It has been a trying period that has forced programs of standardization, elimination of waste, efficient production, cost reduction and aggressive salesmanship and advertising. Those who have heeded the signs of the times have profited, while those who have hesitated are experiencing the ill effects of these new economic conditions.

The report of the Committee on Recent Economic Changes points out bluntly that wholesale prices have been declining during the past seven years, and this in the face of a rising tide of business and prosperity for labor. If there is any tendency toward a greater stability of prices, however, it must come from the more general recognition on the part of business men individually and collectively that there is a greater need today than ever before for knowing accurately their costs and their right to expect a reasonable profit.

Booklet on Heat-Treating Furnaces

"From Steel Balls to Oil Stills" is the title of an illustrated 52-page booklet issued by the Electric Furnace Co., Salem, Ohio. The booklet lists some of the various parts and materials that are treated in electric furnaces and shows furnaces especially designed for handling some of these products, including what is said to be the world's largest electric annealing furnace and the largest furnace for handling forgings.

Industrial Activity Tapering Off

Expansion About Due to Give Place to Moderate
Decline—No Alarming Symptoms—
Conditions Generally Good

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Favorable Factors

1. Continued rise in factory employment and pay-rolls.
2. April gain in building permits and contracts.
3. Good railroad traffic and earnings.
4. Large industrial corporation earnings and dividend disbursements.
5. April machine tool orders high, considering the season.
6. Gold imports, and a high Federal Reserve ratio.
7. Absence of commodity price inflation.
8. Light mercantile inventories.
9. Strong financial position of most leading companies.
10. Progress toward agreement on reparations.

Unfavorable Factors

1. Overloaned position of member banks; excessive brokers' loans; crisis levels for money rates.
2. Continued decline in the P-V line, indicating that commodity supplies are large in comparison with demand.
3. Declining commodity prices.
4. April slump in retail trade.
5. Decline in exports; foreign loans affected by high money.
6. Farm purchasing power lower; slump in wheat.
7. Decline in bank clearings outside New York.
8. Industrial production at high levels, suggesting the peak of a business cycle.
9. Automobile production rounding off; sales spotty and dealer inventories larger.
10. Stock market unsettled and lower.
11. Tariff uncertainties.

BUSINESS at present is very large in volume and industrial activity is high—abnormally so. Nevertheless, it seems that the factors that have an unfavorable bearing on the future trend of business have gained in weight.

The favorable factors are not unimportant; but it must be noted that several of them represent water over the dam and may even be taken as indications of overproduction (railroad traffic and increased employment). Others are merely negative, and favorable only as tending to moderate any recession that may occur (gold imports and high reserve ratio, absence of commodity inflation, strong financial position of industrial companies). Still others are probably temporary interruptions of an unfavorable trend (building activity), or are offset by weakness elsewhere, as the moderate mercantile inventories may be offset by large manufacturers' inventories and goods held by consumers on the instalment plan.

Considering all favorable conditions, however, it seems fair to say that the continued upward trend of employment and pay-rolls, together with the sustained demand for steel, indicates that, even if we are to have a business recession, the turn is not to be called just yet.

Of course, similar reasoning may be used to reduce the force of some

of the unfavorable factors. To some extent, the policy of the Reserve Board in protecting the nation's bank reserves from the demands of stock market inflationists tends to offset the overloaned position of the member banks. The decline in commodity prices is not yet so general or so sharp as to indicate with certainty that this is a seriously unfavorable factor. Possibly large crops may make up for lower grain prices. The retail trade slump in April may be the result of unfavorable weather and the aftermath of an early Easter.

High Level of Industrial Output Cannot Last

But, when all is said, it is hardly open to question that the present level of industrial production is such that there is no reasonable expectation that it can last long. All experience indicates that sooner or later a decline must come, and the steady sagging of commodity prices tends to confirm the conclusion that production is now too great in comparison with the strength of commodity markets. The automobile industry has been the leader in the present business cycle and there are certainly indications of recession here.

The strained condition of member bank credit is clear. The ratio of loans and investments to total deposits is high and the net reserves

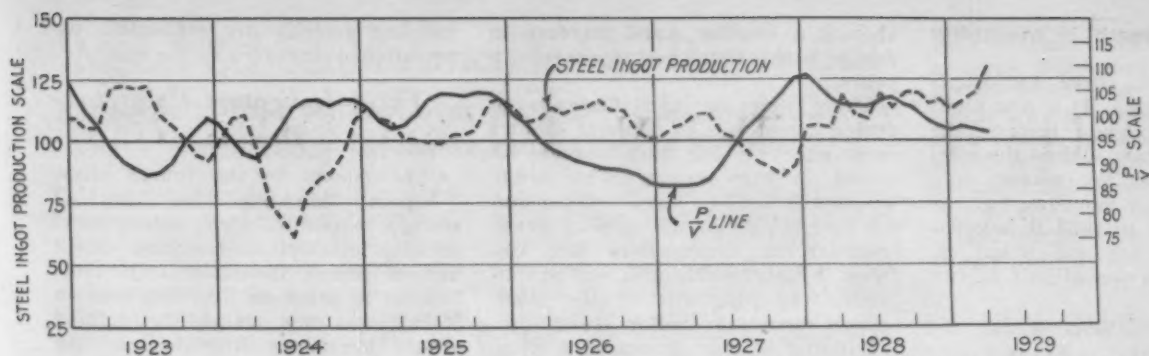
of the member banks are a small percentage of their demand deposits. It is more generally recognized than ever that the stock market has caused a serious drain on our credit supplies.

Money rates are truly high, time money at 9 to 9½ per cent being extraordinarily so. Such rates suggest a strain on credit that in the past has always resulted in checking business expansion.

We conclude that, while business recession is not yet definitely in evidence, nearly all indications point to the coming of such a recession in the second half of the year. But certain favorable conditions at present indicate that the recession will be moderate.

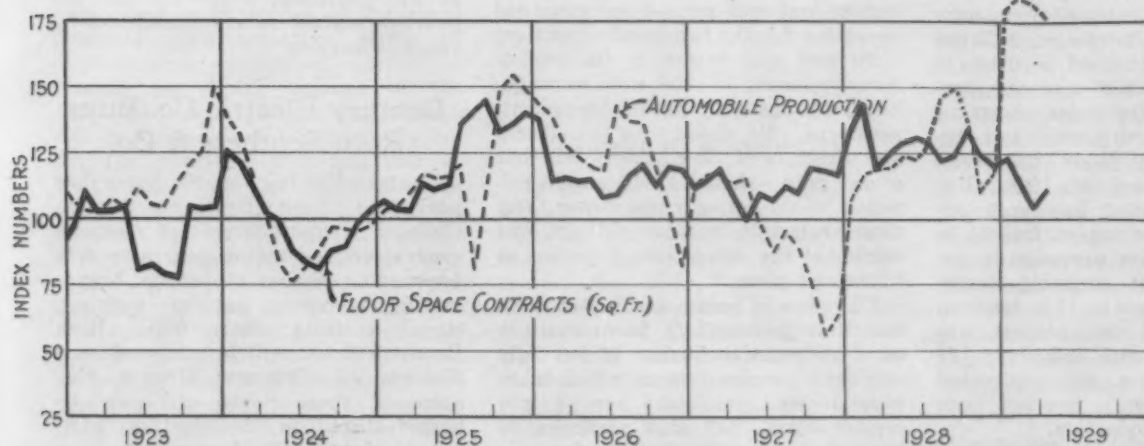
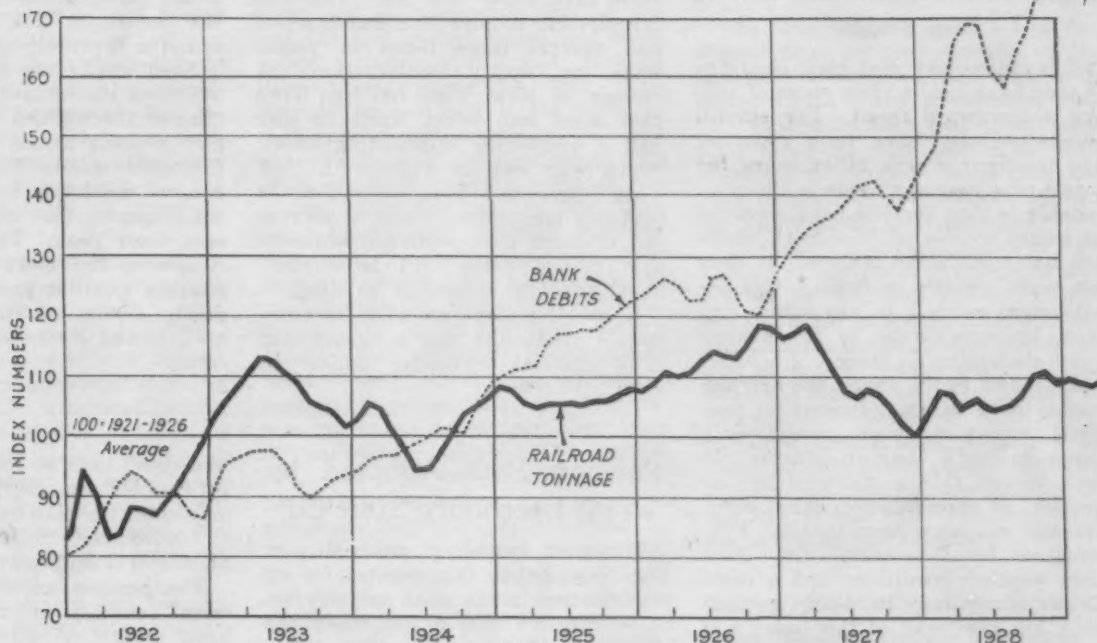
Approach of Peak of Cycle Indicated

OUR P-V line (a ratio of commodity prices to the physical volume of trade) continues to decline gradually, and April finds this barometer nearly down to the estimated normal. Crossing normal on the decline has always indicated the near approach of the peak of a business cycle (as in 1923 and 1926), or of an important intermediate movement (as in 1924). In any case, the continued decline proves that the balance between demand and supply is less



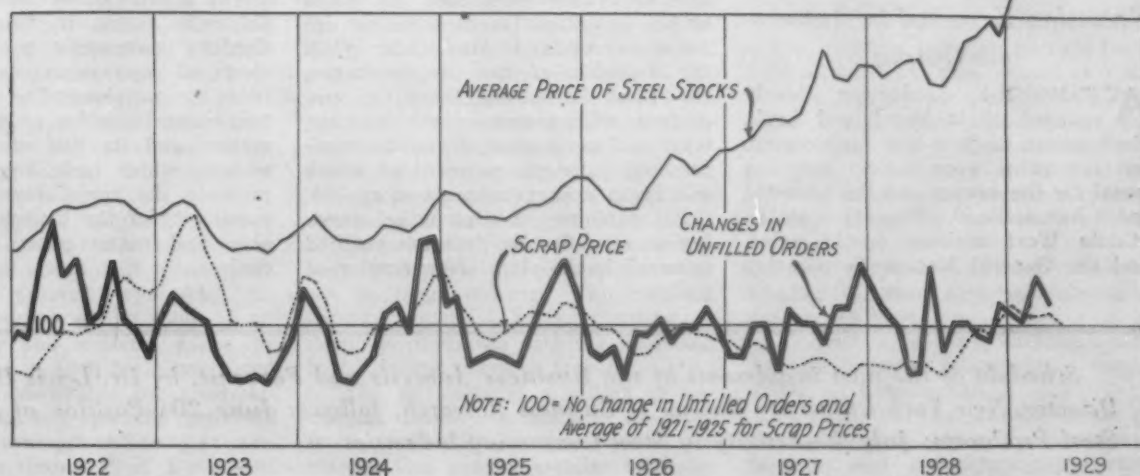
Movement of P-V Line Has Been Slowly Downward for Some Months. Steel production cannot much longer maintain its tremendous pace

Bank Debts, Inordinately High, Reflecting a Huge Volume of Speculation, Have Declined Somewhat. Railroad tonnage, on the other hand, is far below its level of two years ago, though higher than it was last year



Automobile Output at High-Record Levels Made Smaller Gains Than Usual. Building has been moving downward and the April upturn is probably only temporary

Unfilled Orders, While Upward Again, Showed a Smaller Gain. Stock prices have perhaps passed their high points and scrap prices, while higher than for several years, are tapering off



favorable to strength in commodity markets.

The steel ingot curve (adjusted) rose sharply in April. It is now eight months since the minor peak in the P-V line last August. While the steel output, considering the season, may hold up for another month or two, as it did at the peak in 1923, it is probable that production will round off and decline in the second half of the year.

Bank Debits Show Slackening in Trade

IT is noteworthy that bank clearings and bank debits show signs of taking a downward trend. For several weeks declines have been reported, and the figures have fallen below the levels of a year ago. This is the more notable in that declines have occurred at points outside of New York which are not speculative centers. It does not seem possible to explain this development entirely in any other way than by considering it to indicate some slackening in trade.

As shown in the chart, the average weekly bank debits, adjusted for seasonal variation, were considerably lower in April than in March. In fact, though this is obscured by the method of presentation, the April average was lower than that for February or for December, 1928. Possibly weather conditions and a post-Easter slump may be partly responsible, but the trend of this index will bear watching.

Meanwhile, the volume of primary distribution as shown by railroad freight traffic recovered a little in April. Allowing for seasonal conditions, however, the index shows no appreciable upward trend and remains considerably below the levels reached at the end of 1926. Undoubtedly this index has been affected by the diversion of freight to other transportation agencies in recent years, but it probably shows two maladjustments: (1) trading, including financial transactions, has been out of line with industry; (2) primary distribution, as represented by railroad shipments, has not been up to industrial production.

Recession Expected in Automobile Output

AUTOMOBILE production clearly rounded off in March and April. Each month made a new high record, but the gains were not so large as usual for the season and the adjusted index has declined. Reports from the Middle West indicate spotty sales, and the General Motors Corporation

showed a smaller April increase in dealer sales than has appeared in years.

There was an April increase in dealer inventories of General Motors cars, which is the first increase of record in that month. The motor business is still in large volume and the inventories do not appear to be excessive in comparison, but the trend is unfavorable and appears to justify the judgment of the stock market concerning motor stocks.

Building activity increased a little more than usual in April. This was largely due to pipe line construction and several large items of public work or utility construction. A change in New York building laws that went into effect April 18 also had a temporary stimulating effect, which was seen in a jump in New York permits. This situation is probably temporary. There is no reason to doubt that continued unfavorable money rates will have their usual effect in retarding building.

In short, a large recession in automobile production and a resumption of a gradual, irregular decline in

building activity are reasonable expectations.

Three Indicators Point to Decline

ALL indexes in the fourth chart point downward—the rate of change in unfilled steel orders, steel scrap prices and steel stocks. April unfilled orders increased, it is true, but not so much as they had done in March, and this makes the unfilled orders barometer line decline. As usual, scrap prices followed suit and the decline in this sensitive market is not a favorable indication.

Steel stocks are no stronger than the stock market averages, and the decline in the unfilled orders barometer and in scrap prices, coupled with unfavorable money conditions and the general weakness in the stock market, suggest that the "steels" have seen their peak. The steel industry is among the most prosperous, but has the existing prosperity not been amply discounted in the stock market? Is any increase in prosperity in sight?

Pension Plan Adopted by West Leechburg Steel Co.

The first system of insured pensions installed in this country for an organization in the steel industry became effective this month when the West Leechburg Steel Co., Pittsburgh, put its revised program in operation for the benefit of more than 1200 men and women in its employ. Announcement of the new arrangement was made by James Lippincott, president. He stated that the officers and directors of the company felt that some plan should be established, which would not only guarantee their men protection against old age but would, at the same time, function as a savings plan.

The plan is being administered by the Metropolitan Life Insurance Co. on a cooperative basis. It not only sets up a pension system, which takes past as well as future service into consideration, but also arranges to have more than \$2,300,000 of group life insurance continued in force under a contract made with the insurance company in May, 1928. With the inclusion of the life insurance, the West Leechburg Steel Co. employees will receive death benefits, total and permanent disability benefits, and pensions, payment of which will begin upon retirement at age 65.

All employees of six months' standing on the effective date are entitled to enroll in the plan. New employees

and those then at work, but ineligible because of the service requirement, may enter the plan on the first of May or November, following the completion of a half-year of employment.

The pension an employee will receive annually on retiring depends upon length of service and salary. It will represent 1 per cent of his average annual salary multiplied by years of service.

Century Electric Co. Buys Roth Brothers & Co.

Century Electric Co., St. Louis, has purchased Roth Brothers & Co., Chicago, manufacturer of motors, generators and motor generator sets for moving picture projectors, broadcasting, television, battery charging, signal systems, etc. While Roth Brothers & Co. will be operated as a division of Century Electric Co., some of these items will now be manufactured in the Century company's plant in St. Louis.

The acquisition of Roth Brothers & Co. will result in broadening the Century company's position in the electrical apparatus manufacturing field by supplementing its line of polyphase induction industrial power motors and its line of single-phase motors, which have helped to make possible the rapid development and popularity of the household refrigerator and many other widely used devices.

Schedule of the next instalments of the Business Analysis and Forecast, by Dr. Lewis H. Haney, Director, New York University Bureau of Business Research, follows: June 20—Position of Iron and Steel Producers; July 4—Activity in Steel Consuming Industries.

Metal Schedule Amended in House Bill

Paragraphs Inserted to Cover Forged Products and Carbon Steel Tools—Measure Now Goes to Senate

WASHINGTON, May 28.—The metal schedule of the revised tariff bill, which passed the House of Representatives this afternoon, carried several changes in the schedule originally reported by the Ways and Means Committee. One of the important changes provides a subparagraph of paragraph 319, and covers forgings, made dutiable at 40 per cent, which had been included in three paragraphs. Another amendment, as part of paragraph 352, includes carbon steel tools, made dutiable at 50 per cent, with alloy steel tools dutiable at 60 per cent.

The new paragraph on forgings reads as follows:

"Autoclaves, catalyst chambers or tubes, converters, reaction chambers, scrubbers, separators, shells, stills, ovens, soakers, penstock pipes, cylinders, containers, drums and vessels, any of the foregoing (not provided for in paragraph 327) composed wholly or in chief value of iron or steel, by whatever process made, wholly or partly manufactured, if over 20 in. in diameter and having metal walls 1¼ in. or more in thickness, and parts for any of the foregoing, 40 per cent ad valorem."

After the amendment had been introduced by Representative Bacharach of New Jersey, chairman of the subcommittee in charge of the metal schedule, Representative Estep of Pennsylvania explained that the change was made because of the fact that these particular forgings fell in three different paragraphs under the metal schedule and that as they come into the Port of New York there is no definite way for the Customs Service to keep track of the different names under which they come. Those trade names, he said, are now included in the amendment and covered in a separate section of paragraph 319, so that statistics may be kept by the Tariff Commission and the customs officers as to imports. The rate under which they would have fallen in the basket clause, it was stated, was 50 per cent; therefore the committee made a reduction on a portion of the forgings affected. Some, however, have been imported as parts of machinery, dutiable at 30 per cent, and some under the paragraph covering cylindrical furnaces, tubular tanks, etc., taking a duty of 25 per cent.

The amendment adopted to cover carbon steel tools reads as follows:

"Twist and other drill bits, reamers, milling cutters, taps, dies, die heads, and metal-cutting tools of all descriptions, and cutting edges or parts for use in such tools, composed of steel or substitutes for steel, all the foregoing, not specially provided for, 50 per cent ad valorem; if containing more than 1/10 of 1 per cent of vanadium, or more than 2/10 of

1 per cent of tungsten, molybdenum, or chromium, 60 per cent ad valorem. The foregoing rates shall apply whether or not the articles are imported separately or as parts of or attached to machines."

Some of the carbon steel tools, Representative Estep said, were provided for in paragraph 398 of the bill, the new basket clause, and some under paragraph 372 and part of them under paragraph 352. The duty of 50 per cent is the same as that carried in paragraphs 397 and 398. Paragraph 372 provides a duty of 30 per cent, covering parts of machines, under the existing law. With this amendment adopted another eliminated "reamers, taps and dies" from paragraph 397. An amendment was inserted in paragraph 372 placing a duty of 45 per cent on machines for knitting full-fashioned hosiery, and the duty on all textile machinery not specially provided for was increased to 40 per cent from 35 per cent, coming in paragraph 372. The duty on penknives, pocket knives pruning knives, etc., valued at not more than 40c. per doz., was increased to 2c. each and 50 per cent from the original provision of 1c. and 50 per cent, these lines coming under paragraph 354.

The bill will now be the subject of hearings before the Senate Committee on Finance.

Farm Situation Seen as Threat to Prosperity

Trade and industry, taken as a whole, during April showed some signs of seasonal slackening which, however, particularly in industrial centers, has been "unusually mild," according to the May report of the Conference of Statisticians in Industry, which operates under the auspices and with the cooperation of the National Industrial Conference Board, New York.

General business is continuing at levels not far below the records of the first quarter of the year and is likely to continue at these levels for some weeks to come, according to the report. Operations in the heavy industries, such as iron and steel, automobiles, electrical equipment and agricultural machinery, during April and during the first half of May have continued at or near the high levels of the current year. Foreign trade, both in exports and imports, continues in large volume. The building industry made a better showing in April as compared with the declining trend during previous months.

"The agricultural situation is becoming uneasy, as farmers are once more faced with the prospect of receiving this year a smaller total return for larger crops," in the view of

the conference, and it sees signs of a possible depression in agricultural areas which may "accelerate the downward correction from recent high levels of industrial operations which may be expected in the near future." This, however, according to the report, may be offset by sustained recovery in the building industry and an easing of money rates.

Sloss-Sheffield Passes Common Dividend

The Sloss-Sheffield Steel & Iron Co., Birmingham, omitted payment of the quarterly dividend of \$1.50 a share by action of its board of directors May 24. Dividends have been paid regularly since the first quarter of 1924, although in previous years they had been omitted when conditions did not seem to warrant their payment.

The action of Sloss-Sheffield is a reflection of the unsatisfactory pig iron market in the Birmingham district. Prices, at \$15 to \$15.50, are the lowest since before the war, with the exception of a few months early in 1922, when the market was \$15. Nearly all Birmingham furnaces have large stocks of iron in their yards, and demand, usually fairly good at this time of year, has been cut down because of the sub-normal rate of operations in the cast iron pipe industry.

Sotter Brothers Co. Bought by Philadelphia Interest

The stock of the Sotter Brothers Co., Pottstown, Pa., has been purchased by Plate Fabrications, Inc., Philadelphia. The new officers of the Sotter Brothers Co. are Joseph Levin, president; Philip Sotter, vice-president; Fred Sotter, treasurer; George E. Gude, of New York, secretary. The company will conduct its business as heretofore, specializing in high-pressure air receivers and special tanks and kettles for the chemical industry, as well as general steel plate fabrication. Both the sales and engineering forces of the company have been enlarged.

Aviation Industry Built 3496 Engines in 1928

The aviation industry in 1928 built 3496 aircraft engines, valued at \$16,809,164, and 700, valued at \$426,879, were rebuilt and reassembled, the Department of Commerce has announced. Its survey was based on returns from manufacturers representing about 95 per cent of the industry.

Spare parts for engines, valued at \$2,812,216, were also manufactured during the year.

Aircraft propellers numbered 14,358, as follows: Wood, 9163; metal, 4809; all others, 386.

This was the first annual census of aircraft engine and propeller manufacture, and comparative statistics for earlier years are not available.

Protecting Control Devices from Dust

Prevalence of Graphite Dust in the Bessemer Sections of Steel Mills Makes a Covering Essential for Ease in Maintenance

BY W. J. FLEMING AND L. F. WORDEN*

GRAPHITE dust suspended in the air in the Bessemer section of any steel mill settles on every piece of apparatus in the vicinity. Being almost pure carbon, graphite is a good conductor of electricity and, because of its finely powdered condition, it may cause severe arcs and grounds.

Hot-metal ladle cranes used in the Bessemer plant are usually equipped with magnetic control devices. It has been common practice to use open-type panels made of slate, which required considerable maintenance to avoid grounds, and trouble often developed.

Substitution of compound for slate bases in modern panels has considerably reduced troubles from breaking of bases in shipment or from excessive vibration of machinery. But

*General Electric Co., Schenectady, N. Y.

these compound bases are no better than slate in withstanding the arc caused by graphite or carbon deposits. It therefore has become standard practice to inclose the panels in cases as nearly dust-tight as possible, consistent with reasonable first cost.

In the Indiana Harbor plant of the Youngstown Sheet & Tube Co. the control devices were inclosed in cases which are standard except that the metal is twice as thick as in ordinary service. These cases are equipped with felt gaskets $\frac{1}{4}$ in. thick, applied to the backs and doors of the case. This use of inclosing cases for control apparatus is looked upon as a distinct advantage, as it decreases the maintenance necessary in keeping the panels free from graphite dust.

originated in the United Kingdom. About half the remainder came from British India, while the Netherlands supplied 16 per cent of the total.

Imports during the first four months were 47,672 tons, showing a reduction of nearly 12 per cent from the 53,764 tons of last year. This reduction was almost wholly accounted for by a decline of about 6000 tons in pig iron from the United Kingdom. The United Kingdom, in spite of the drop, furnished about three-eighths of the total, while a slightly smaller amount came from British India. Netherlands, in third position, supplied 23 per cent of the total.

Office Removals

Brown Instrument Co., Philadelphia, has moved its Boston office from 161 Devonshire Street, to 1107 Public Service Building, 89 Broad Street.

Vanadium Corporation of America has moved its Chicago office from suite 1604 in the Straus Building to suite 2104 in the same building.

Philadelphia offices of the Builders Iron Foundry and the Diamond Machine Co. have been removed to 903 Elverson Building, Philadelphia.

Gisholt Machine Co., Madison, Wis., has moved its New York office to Room 702, 30 Church Street. R. D. Heflin is in charge.

Wrought Iron Co. of America, with plants at Lebanon and at Scranton, Pa., manufacturer of bar iron, bolts, nuts and rivets, has opened a branch office at 161 Devonshire Street, Boston, in charge of William M. Brodhead.

Johns-Manville Corporation, New York, has removed its Milwaukee sales office to the Railway Exchange Building, 97 East Wisconsin Avenue, Milwaukee.

Industrial Club of St. Louis has issued a brochure entitled, "Saint Louis as an Aviation Center." Based on the directory of airplane and airplane engine manufacturers published in the Jan. 3 issue of THE IRON AGE, the analysis shows that 49.7 per cent of the total number of manufacturers listed are located in the central states, of which St. Louis is the geographical center.

New Electric Motors for Steel Mill Service

Electrical equipment for the Monroe, Mich., sheet mill plant of the Newton Steel Co. has been placed with the General Electric Co. The order includes two 2,000-hp. motors for driving sheet mills, four 500-hp. motors for driving the cold rolling mills, crane motors, various auxiliary motors and a switchboard.

A 3,000-hp. 100-r.p.m., 11,000-volt synchronous motor will be installed by the American Steel & Wire Co. at its Newburg steel plant, to replace a steam engine now driving a billet mill. This synchronous motor will be of the highest voltage of any ever built for steel mill service. The high voltage will be provided to take 11,000-volt alternating current direct from the lines of a power company, without using transformers.

Steel Furniture and Steel Shelving Orders

WASHINGTON, May 28.—April orders for steel furniture in the "business group" were valued at \$2,880,395, against \$2,883,716 in March, according to reports made to the Department of Commerce by 34 manufacturers. The drop from the high figure of January was more than \$1,000,000. Shipments were valued at \$2,844,938, compared with \$2,923,363, while unfilled orders at the end of April were valued at \$2,377,999, against \$2,343,888 at the end of March.

Orders for the first four months were valued at \$12,717,052, compared

with \$12,742,699 for the corresponding period of last year, and shipments were valued at \$12,625,843 and \$11,856,178 respectively.

Orders for shelving furniture in April were valued at \$1,095,329, compared with \$1,145,632 in March, according to reports received from 16 producers. Shipments were valued at \$1,131,362, against \$1,109,876, and unfilled orders at \$865,484 and \$801,643 respectively.

Orders during the first four months were valued at \$4,260,093, compared with \$3,091,814, and shipments were valued at \$4,117,513 and \$2,909,974 respectively.

Pig Iron Imports Decline Again

WASHINGTON, May 25.—Imports of pig iron in April declined to 6693 gross tons, from 8572 tons in March and 16,299 tons in February. The total was only one-third that of April, 1928, when 20,095 tons came in. Nearly half of the month's imports

UNITED STATES IMPORTS OF PIG IRON BY COUNTRIES OF SHIPMENT

	(In Gross Tons)		Four Months Ended April	
	April			
	1929	1928	1929	1928
United Kingdom	3,000	8,897	17,490	23,445
British India	1,826	4,196	17,222	16,962
Germany .....	.....	.....	53	40
Netherlands	1,053	5,204	10,958	10,733
Canada	127	54	386	378
France .....	.....	.....	.....	.....
Belgium .....	.....	5	184	202
Norway	391	.....	648	.....
Sweden	265	456	603	601
All others	31	1,283	128	1,403
Total	6,693	20,095	47,672	53,764

This Issue in Brief

High money rates no cause for business recession, says economist. If a decline in business does take place, money rates will be a relatively unimportant factor, as business is less dependent than formerly on bank accommodations.—Page 1471.

* * *

Forgings produced by machine have uniform physical properties throughout. In hand forging there are many different temperatures and weights of blows at different parts of the same forging, resulting in widely different physical properties.—Page 1476.

* * *

Welded structures of chromium iron have met with little success, says metallurgist. When temperatures are above 1500 deg. Fahr., this material develops extremely large grain size, weakening the welded areas. — Page 1482.

* * *

Operates open-hearth furnace satisfactorily with combination of blast furnace, coke oven and producer gases. The first two are mixed in a mixing station, and comprise 35 to 40 per cent of the total.—Page 1487.

* * *

Annealing tools before hardening them reduces the tendency to crack during quenching and increases the toughness of tempered anneal, X-ray investigation indicates. While a single heating through the critical point tends to reconstitute the crystalline structure, a multiple heat treating is doubtless necessary for complete recrystallization.—Page 1490.

* * *

Increasing profits do not necessarily mean that a manufacturer is holding his place in his industry. Banker warns against indifference, brought on by adequate profits, and recommends that manufacturers keep posted on the state of health of their individual businesses in relation to the whole industry.—Page 1492.

Machinery exports down in April; iron and steel up. Value of machines shipped to foreign customers in April was 51.3 million dollars, 16 per cent under March but 38 per cent over April, 1928. Iron and steel tonnage export was 2 per cent above March.—Page 1541.

* * *

Where nitriding is done, metallurgist recommends use of nickel-chromium or chromium-iron alloys for furnace parts, with nickel tubes for introducing ammonia gas into the furnace. Nickel plate is used as a "stop off" where soft spots are desired on the parts being hardened.—Page 1500.

* * *

Lower cost steel of improved quality is expected of new open-hearth furnaces equipped with automatic valve controlling air and gas valves and stack damper. It will be impossible to operate any one of the three separately.—Page 1495.

* * *

Slump in security prices does not necessarily mean a falling off in industrial activity. Economist points out that industry has grown for 75 years at an almost uniform rate through the widest changes in security prices due to changing credit conditions. — Page 1473.

* * *

Defines stainless steel as a material containing under 16 per cent chromium, which will harden by quenching and which further allows a hardness relative to its carbon and chromium content, or which is capable of attaining a Brinell hardness of 250 or more by heat treatment.—Page 1479.

* * *

Recommends non-cancellable clause in orders for machinery placed in times of high demand. Machinery builder finds great majority of buyers agreeable, and in this way protects himself against being left with a large stock on his hands in the event of a business decline.—Page 1493.

Condemns "top-dressing" of cars of scrap. Scrap Institute seeks to protect buyers and sellers of scrap against unfair methods, by adopting a business code.—Page 1497.

* * *

Riveting recommended for chromium-iron structures intended for corrosion resistance. Metallurgist declares that riveted structures withstand corrosive conditions exceptionally well.—Page 1481.

* * *

Limiting creep stress for commercial steels (0.17 to 0.51 per cent carbon) is only 36 per cent as much at 900 deg. Fahr. as at 700 deg. Fahr. Steels extend continuously under comparatively low stresses. The "limiting creep stress" is 0.001 in. per inch in 100 hours.—Page 1473.

* * *

"A little honeycombing here and there on the wage scale" will break down prosperity, says James A. Farrell. Recommends fairness to labor, restraint in plant expansion, and willingness to do next month's business next month, rather than this month, as contributions toward continued prosperity.—Page 1484.

* * *

Cold work takes place in two stages, X-ray reveals. In the first stage, in stretching or cold drawing through a die, the crystals are apparently fragmented. This stage extends up to an amount of cold work equivalent to 10 to 20 per cent reduction in area. Heavily cold-worked structure persists, even after annealing at fairly high temperatures.—Page 1490.

* * *

Employees' suggestions make money for machinery builder. Suggestion committee in one company has handled more than 5000 ideas, suggestions and projects in nine years, and has completed over 90 per cent of them.—Page 1498.

A. I. FINDLEY
Editor

THE IRON AGE

W. W. MACON
Managing Editor

ESTABLISHED 1855

Volume Without Sacrifice of Price

QUITE a different picture from the one made familiar to members in recent years was presented at the meeting of the American Iron and Steel Institute last week. Pleas for adequate prices, "live and let live," competition and trust law modification—all reflecting post-war maladjustments—were conspicuously absent. They do not fit the situation of today. Both in private and public comment prosperity was frankly recognized.

Adapting themselves to changed conditions, institute leaders presented a new and pleasanter problem—the preservation of good times. Not that their optimism was untempered by caution. On the contrary, factors threatening to business were squarely faced and freely discussed. High money rates, however, were not among them, not once being mentioned by institute speakers. This omission need not be ascribed to any studied effort to hide or gloss over unpleasant subjects, for the remarks from the rostrum were marked by unusual candor.

Perhaps the typical attitude of the steel trade is that of a leading executive who, when interviewed in the corridor last Friday, said: "I don't like the credit situation, but so far it has not affected business and the present momentum of demand may prevent it from doing so."

Steel leaders are more fearful of disturbances that may arise from their own ranks. Undue sales pressure was condemned at last week's meeting as carrying the risk of creating an unnecessary bulge of business, which only accentuates subsequent recession. The industry was also warned by President Farrell of the Steel Corporation against interference with wage scales or extension of working hours.

Prices, at least in the view of Mr. Farrell, are on a satisfactory basis, since their reasonable level, he believes, has been chiefly responsible for raising business to its present proportions.

It is not long ago, however, that prices were called inadequate, and their strikingly small rise in the interim indicates by what a narrow margin prosperity has been achieved. It would require no sharp turn of the market to bring back a condition where volume would be sought at the expense of profit. One need only be reminded that reductions in costs to permit price concessions, if we are to accept the testimony of steel leaders themselves, are more and more difficult and in many cases well nigh impossible.

The alternative is to find a way of increasing volume without sacrifice of price. It is true, as President Schwab told the institute, that new uses for steel are increasing, but the real question after all

is whether they are multiplying as fast as they should.

Competition of industry against industry Mr. Schwab mentioned as a new economic condition that must be faced, and he emphasized the need for market research—"the seeking and encouraging of new uses for our products." Yet he declared that such activity cannot be carried on by the institute. That this work can be done in a cooperative way has been demonstrated by other industries which have organized for the united cultivation of markets, employing both research and highly effective publicity. Indeed, a section of the steel industry, that which produces sheets and strip, has done an excellent piece of collective promotion in widening the field for flat products. Proof of the success of this effort is an increase of nearly 2,000,000 tons in the output of sheets and strip in 1928. That is 40 per cent of the 5,000,000 tons increase in finished steel output last year over that of 1927, though sheets and strip are but 19 per cent of the total production.

No subject touched on in Mr. Schwab's notable address is so vitally important to the steel industry as ways and means of increasing to the largest possible extent the use of its products. To that end it should employ every approved agency of modern marketing to put steel in a foremost place in the public mind.

A Moratorium in Steel

BOTH the president of the American Iron and Steel Institute and the president of the Steel Corporation suggested in positive terms last Friday that the steel industry have a moratorium in new construction. Mr. Schwab said that all steel men knew how the industry had paid dearly for over-expansion in the past, and that many industries in the United States are still suffering from war-time expansion, while it is but lately that the steel industry has caught up. Mr. Farrell made the significant statement that in the past five years the Steel Corporation had increased its open-hearth capacity by only 1,700,000 tons, doing that by rebuilding and improving old plant, whereas independents had increased their capacity by 8,250,000 tons.

Mr. Schwab's contention that the industry has had excess capacity until lately is supported by the statistical data that relative to capacity, ingot production has ranged from 69 per cent in 1924 to 83 per cent in 1923, 1926 and 1928, the six years averaging an engagement of 79 per cent of the capacity existing from time to time.

This matter of moratorium in steel construction is

a human affair, a question of the conduct of men—what the steel producers will now do. None should be misled by the thought that “everybody’s doing it.” In the first place that is not the fact. In the second place much of the new construction has been replacement, along two lines: the replacement of one form of capacity by another and the replacement of obsolete by new equipment. Observe that acid open-hearth ingot capacity was reported at 1,598,850 tons for Dec. 31, 1917, but at only 1,088,185 tons for Dec. 31, 1928, wherein there was some conversion to basic and some abandonment; also that Bessemer capacity dropped from 12,830,400 tons at the end of 1921 to 8,513,000 tons at the end of last year. There is no occasion to “keep up with the procession” for as a matter of fact there is not so much of a procession as might appear.

Mr. Schwab’s suggestion that steel producers should see if they cannot get still more tonnage out of existing plant is very much to the point. He observed that “record after record is being broken with substantially the same plant and the same personnel.” Definite data on this subject were cited in this department of *THE IRON AGE* of May 9, 1929, to the effect that in ten years basic open-hearth ingot capacity increased 13,172,000 tons while new construction according to our annual summaries amounted to 5,920,000 tons or only 45 per cent as much. A large part of the remaining increase was simply the result of modernization and improved practice in using the facilities.

Finally it is in order to suggest that the experience of the past year or thereabouts in steel demand is not adequate proof of the future. This demand has been well above the trend line of the general period of activity, now nearly seven years old.

More Steel Exports, Less Imports

ROLLED and finished steel exported from the United States in the first four months of this year makes a total one-third greater than that for the like period last year. Meantime imports of the same classifications have declined more than one-third. Export gains have gone consistently through the list, rails and fastenings alone showing a decided drop. Shipments abroad of steel bars and of hoops, bands and strip steel have practically doubled, and those of alloy steel bars have more than doubled. Incoming tonnages of steel bars, however, have been only one-third as heavy as last year.

But exports, after all, form only a small part of our outlet for steel. Assuming the usual conversion loss from ingots to finished steel, our exports in the first four months have been one-sixteenth as much as our make, compared with one-nineteenth of our smaller production of last year.

AN effective proof of the need of a standard practice was staged at the meeting last week of the National Machine Tool Builders’ Association. A group of eight panels of colors for machine body finish demanded by some twenty buyers disclosed differences in shades that were difficult to discern even at a distance of a few feet in daylight more intense than exists in the average machine shop. It is not surprising that agreement was unanimous that

steps be taken to eliminate an annoying source of expense, little though it may be in the individual case, whoever pays. Accordingly at the machine tool show in Cleveland in September the plan is to have a uniform machine tool color. The result is expected to prove satisfactory to users besides emphasizing what can be accomplished by cooperative effort.

Duralumin in Aircraft

IT is evident that aircraft builders are continually putting a larger proportion of metal into their ships. Various steels and alloys are used in main members of the structure, such as cold-drawn steel tubing, chromium-molybdenum steel tubing, formed strip of stainless steel, extruded duralumin shapes and cold-drawn wire cable. The problem of efficient and satisfactory joints at the complicated intersections has also been given much study. No one doubts that the ability to weld many of these alloys has simplified the latter problem enormously.

Up to the present, however, no commercial method for welding the strong aluminum alloys has been devised. This has sharply limited their use to parts which can be riveted. Gasoline tanks, for instance, are made of pure aluminum sheet, properly stiffened by diaphragms. Though tough, this metal is not very strong; nevertheless it can easily be welded by the oxyacetylene flame into a sound joint substantially 100 per cent efficient. A welded seam in duralumin sheet (or any of the other strong aluminum alloys) is not practicable, because the superior strength of the alloy depends upon previous quenching and aging, and the effect of this precise heat treatment is destroyed by the annealing effect of the welding heat in a zone alongside the joint. Subsequent heat treatment of a completed structure, light and spindly, has appeared too delicate or too expensive to attempt, except for rather minor assemblies.

Despite these difficulties, one need not conclude that the problem is hopeless. Where there is an important end to gain, means usually are found. Thus, it is desirable from many points of view to replace with very thin sheet metal the doped fabric now used for covering airplane wings and bodies. While this has been done on some large all-metal airplanes, many difficulties associated with the method of attachment are preventing a wider adoption. If it could only be “stitch-welded” in place, the problem would probably be solved.

A first step along the proper road appears to have been taken already, and for an entirely different reason: Duralumin corrodes readily, especially in salt-water spray. To avoid this trouble, strong aluminum alloys are being made with a thin but corrosion-resistant coating of tightly adhering pure aluminum. Such material is called “alclad.” Now, it is common knowledge that pure aluminum can be easily welded, so the problem of welding alclad is something like this: Press the parts together between pointed copper dies of a spot-welding machine, and pass a momentary current of high intensity across the joint, giving just enough electrical heat and mechanical pressure to cause a small round weld between the aluminum coatings, yet not heat enough to work back and anneal the hardened sheet within, or at least to

no larger volume than would be taken out in a corresponding rivet hole.

Such solution is not beyond the possibilities. In fact, any one who has marveled at the myriad of rivets in a duralumin structure, and who realizes the immense amount of layout and fitting labor which has been absorbed, is convinced that some method of welding this material into a joint at least as efficient as though riveted is to be expected in the not distant future.

Large Tonnage of Line Pipe

IN view of the large amount of line pipe made at Milwaukee last year it is surprising that the production statistics, which do not include upward of 350,000 tons that was electrically welded, show record high output of "oil country goods" for the year, the total reported being 1,833,978 gross tons. There was so much line pipe business that the pipe and tube mills could "lose" this round tonnage to the new electrical welding industry and still make a new record.

The statistics as gathered by the American Iron and Steel Institute include line pipe with "oil country goods," whereas in common trade parlance "oil country goods" is one thing and line pipe another. The former expression commonly covers casing, tubing, drill pipe, etc. The manufacturing and selling trade recognizes that it is one thing to produce oil and gas, by drilling wells, and another thing to transport it, by laying pipe lines. There are, moreover, great differences in diameter, thickness of wall, etc.

It was the large volume of line pipe business that made last year's production of "oil country goods" so heavy. There was less drilling than in some previous years, though more than the average. It is to be noted that, while last year made a new high record, the welded pipe mill lost while the seamless gained somewhat more than the older producer lost. Production of seamless tubing has been reported since 1913, but the complete segregation into classes, including oil country goods, has been made only since 1926. The following table gives the details available since 1920:

Reported Production of Oil Country Goods—Gross Tons			
	Welded	Seamless	Total
1920.....	1,261,778	.....*	.....
1921.....	891,995	.....*	.....
1922.....	1,139,834	.....*	.....
1923.....	1,358,889	.....*	.....
1924.....	1,183,867	.....*	.....
1925.....	1,018,302	.....*	.....
1926.....	1,328,294	446,078	1,774,372
1927.....	1,199,936	561,002	1,760,938
1928.....	1,108,446	725,532	1,833,978

*Not separately reported.

Nineteen twenty-three was a big year for drilling and the best year in production of welded oil country tubular goods. As seamless oil country goods increased sharply from 1926 to 1928 and as the total production of all classes of seamless in 1923 was only 403,783 tons, it is evident that the total production of welded and seamless oil country goods was much below that of any of the last three years. The year's demand for welded pipe in general appeared to be very heavy, leading to no little new construction in the next two years, while the recent course of events, with such a swing to seamless, suggests that the new construction was not in all cases necessary.

The statistics show that no small part of the re-

sponsibility for pipe mill capacity not being as well engaged as other mill capacity is due to demand for standard or merchant pipe not holding up well. Production of lap weld and butt weld standard pipe decreased from 1,913,052 tons in 1926 to 1,693,144 tons in 1928, and that was not due to encroachment of seamless, which in that category remained insignificant, merely increasing from 9204 tons in 1926 to 19,416 tons in 1928.

The Art and Snares of Bricklaying

TRAUTWINE reckoned 35 years ago that a brick mason should lay about 150 bricks per hour in common wall work. Kidder 25 years ago considered 160 a fair average and computed that with wages at 62½ cents per hour for masons and 31¼ cents for hod carriers the cost of laying common brick in a 12-inch wall was about \$6 per thousand. With brick costing \$9 per thousand the total cost was about \$15 per thousand laid. The price for brick is higher now, but the cost of laying is very much higher. A recent estimate for a small brick building in New England was \$20 per thousand for the brick and \$50 to \$60 per thousand for the laying of it. The bricklayers there get \$1.50 per hour and they do not lay so many brick. This has become the most costly form of construction. If the general index of building cost has risen to 200 that for brick masonry is 300 or more.

The 12,000 bricklayers of New York have just made an agreement with their employers whereby for the next three years they are to get \$15 per day of eight hours at once and \$15.40 after Jan. 1, 1930. That is as much as the transient rate for engineers and draftsmen of considerable experience, and certainly of a higher order of intelligence than the bricklayer needs, or probably possesses.

Probably the building contractors have no strong feeling about agreeing to such wages except insofar as they discern that these rates may curtail building, and by thus rendering them unable to pass the thing on to their customers may increase the quotient of overhead. The bricklayer himself is more or less indifferent as to whether he works full time or not. He may, however, complain of the high rent of his apartment, to the elevation of which he has himself contributed. Even so he is far better off than his fellow workers who do not belong to unions that have everything their own way.

Of course, we should find no more fault with the bricklayer for getting \$15 for an eight-hour day than with a professional man for getting \$200 if demand establishes such rates of remuneration. There is the difference that only a few professional men receive such a reward, and if they do it is certain that they earn it, while all bricklayers get their rate and there is more or less doubt whether any of them earn it. Bricklaying is not an art that is difficult to learn and it is probable that there are many able-bodied, intelligent men who would like to compete in that employment if they were free to do so. But they know better than to try.

The same condition obtains in numerous other trades. We have, in short, a vocational system that is more restrictive, dictatorial, voracious and wasteful

than anything else in our national economy. The wonderful thing is that the masses of our fellow citizens are so serene, anyway so silent, while this predatory system makes mincemeat of them. No Borah or Brookhart or Norris has ever raised his voice against this; but they rant against Wall Street, meaning the corporations, which, in fact, are the only counteracting power against the monopolistic guild system.

The research laboratories, engineering departments and managerial organizations are indeed the opposing force that makes it possible for the people to live with any comfort. The bricklayers, carpenters and plasterers say, in effect, that families may huddle in two or three rooms for all they care, and the corporations (engineers) respond that they will substitute concrete for brick work, mill-framing for hand-sawing, and composition board for plastering, etc. In short, they will reduce the opportunities for non-

competitive labor as much as possible. Sooner or later this tends to produce a surplus of craftsmen, which constrains programs for getting the out-of-work boys on to a pay-roll somehow.

Alas! the engineers are unable to protect the unfortunates who need to have repair jobs done, and if they happen to reside in a municipal region they are real pickings for the carpenter, the painter, the plumber and all the rest. We are reminded of a man who had a broken cuff link repaired and found that the job came to more than the first cost, gold and all. But the commuter, who is generally resourceful, is discovering rapidly that he can do more and more of these things, which after all are quite simple if the proper tools be possessed, and in such possession and the use of them finds there is a joy. Nor should we omit to mention the technical magazine that instructs him in many ways.

Must Find New Uses for Steel

President Verity Urges Extension of Markets in View of Constantly Increasing Capacity

MIDDLETOWN, OHIO, May 29.—President George M. Verity of the American Rolling Mill Co., on his return from the American Iron and Steel Institute meeting in New York, was asked by an IRON AGE representative as to the outlook for the steel industry. He expressed confidence that production would continue on a large scale, but added that the industry needed to be alert to future possibilities.

"In times of great activity," said Mr. Verity, "and even of fair prosperity when things are moving along aggressively there are danger signals that must be recognized and respected, if a drastic reversal of the situation is to be avoided. Prosperity has its pitfalls equal to those of adversity."

"In the steel industry we must constantly strive for increased stability in every phase of the business and especially in the problems of distribution. We must support all sound means for increasing consumption of iron and steel products. New uses and new markets must constantly be found to protect an ever increasing productive capacity. A policy of 'sufficient unto the day' is certain to be disastrous."

"While the steel industry of America has become very large, mere largeness will not insure either its growth or its perpetuation. To live it must be great and its products and its service must be good. The average policy of all the units in the industry will determine its greatness and its fitness. Large industrial and commercial adventures have failed because they did not become great and fit to meet the need of their time."

"Our industry must produce largely, but it must also produce the best in quality and give the best service possible. We cannot because of any bigness, any greatness or even any

goodness sit down quietly by the side of the commercial and industrial stream of complex activity and hope to enjoy the scenery. We must keep in the center of the stream, in the very midst of the ever growing activities, steer our craft and help make the conditions under which we live and work. Eternal vigilance was never so necessary to life and progress as it is today."

James A. Farrell's Medalist Address

The bestowal of the first Gary Memorial Medal on James A. Farrell, president of the United States Steel Corporation, was the feature of the semi-annual banquet of the American Iron and Steel Institute at Hotel Commodore, May 24. In his speech of acceptance, Mr. Farrell said:

"In humbly accepting this medal, I am, with you, deeply conscious of the outstanding life work of Elbert Henry Gary, the organizer and beloved president of this institution for a score of years, in whose memory it has been struck."

"It is a fitting monument to its namesake, whose fine spirit, courage, patience and consideration are remembered by all his former associates. Judge Gary was a great leader, a unique personality and, in conceiving this organization of the iron and steel industry, he has left a lasting testimonial to his genius."

"At this time we may well bear tribute to such farsighted men of the early American steel industry, who were willing to invest their all in work and money when the visibility of financial returns was not so certain. The progress and results achieved have come from the collec-

"We must also put character into our industry so that we can acquire and keep that measure of confidence and good-will of the nation, its people and its institutions that is essential to continued usefulness and progress. A constant and ever increasing effort for greater efficiency, greater stability, better and cheaper service must be made if we are to hold our own, not to say making progress."

"In the words of J. E. Edgerton, former president of the National Association of Manufacturers, 'We must not be fugitives from information or prisoners in the cells of our own self-sufficiency.'"

tive efforts of many minds; the honors do not belong to the individual but to the many working in unity and cooperation."

"We have many unsolved problems to which our technologists, engineers and scientists are bending every human effort in plant, shop and laboratory for a solution. In this they are given every possible assistance and encouragement, and results will issue therefrom that will further benefit mankind and the people of the future."

"My association with, and labor in, the iron and steel industry, from early boyhood, has been one of imagination, happiness and fascination. In this appropriate moment I earnestly wish to deliver my promise to you tonight that there will be no abatement in my vigilance in the furthering of the progress of the steel industry or in my interest in the aims of the Iron and Steel Institute, and the welfare of the men and women connected with it."

"It has been inspiring to me to have received your demonstration of loyalty and good will. The many kind words and good wishes, by deed and action, which you have so sincerely bestowed upon me will be remembered during the remaining years that by Divine Will may be allotted to me."

Iron and Steel Markets

Steel Corporation Breaks Record

Subsidiaries Set New High Mark in Week's Ingot Output—

Demand Sustained Except From Motor Car Industry—

Steel Prices Reaffirmed for Third Quarter

THE steel requirements of the automotive industry continue to taper, but there are no evidences of a general decline in demand. Deliveries of forms of steel largely used in motor car manufacture have shown improvement, but on other finished products mill backlogs are undiminished.

Shipments continue at a high rate and ingot production for May will show little, if any, reduction from that of March or April, completing the third month of virtually capacity operations.

The ingot output of Steel Corporation subsidiaries last week, at nearly 500,000 tons, set a new six-day record. This production was at the unprecedented rate of 25,000,000 tons a year, or 800,000 tons in excess of theoretical capacity.

With open-hearth furnaces heavily taxed, some producers have asked customers who had specified the Siemens-Martin product to accept Bessemer steel instead. Certain it is that all available equipment is being used to turn out steel, and undoubtedly the wear and tear on open-hearth plants has caused available converters to be rushed into service.

The recession in specifications from the automobile industry is not yet sharp. The leading makers of low-priced cars evidently plan no curtailment in their output, and, while some other companies which are bringing out new models are making drastic cuts in their production schedules, they are expected to resume operations on a broad scale in August.

Meanwhile mill backlogs are surprisingly well maintained, despite the high rate of shipments during the past month. At Pittsburgh, mill commitments on bars, plates, shapes and sheets will show very little contraction as compared with the end of April and will sustain a high rate of operations until July 1. Further releases against contracts, which will be accepted by most mills until June 15, will undoubtedly carry over considerable second quarter tonnage into July and August. A large sheet consumer in the East has specified its requirements as far ahead as September.

Construction work shows no decline and may take more, rather than less, steel in the immediate future. Nearly 71,000 tons of fabricated structural steel has been added to the pending list in the past week. Large projects are numerous, new ones including a dam near Pasadena, Cal., calling for 10,000 tons, and a New York subway section, requiring 9500 tons. Plate and shape bookings on the Pacific Coast thus far this year exceed the total for the entire first half of 1928.

A branch of construction activity that is steadily gaining in importance is highway building. Road machinery manufacturers are consuming steel at the limit of their plant capacities.

Shipbuilding programs continue to mature, and two vessels for the Matson Navigation Co., placed with the Fore River Shipbuilding Co., require 20,000 tons of plates and shapes.

Railroads, despite delayed deliveries on their winter purchases of rails, are taking more interest in their supplementary needs. The Southern Pacific has entered the market for 40,000 tons. The Mexican Central has ordered 240 box cars from an American equipment builder and is expected to buy 800 more. A Western road may soon inquire for 5000 cars.

Present prices on hot and cold-rolled strip, wire products and bolts and nuts will be continued into the third quarter, according to announcements by various manufacturers. Prices on bars, plates and shapes for that period have not been formally named, but some mill representatives have been authorized to take contracts at current quotations. Cold-finished steel bar makers will soon open their books and propose to extend the time limit for third quarter specifications until Sept. 30, thereby abandoning the plan, adopted last year, of requiring all releases to be made 15 days before the end of a quarter.

Pig iron buyers continue to delay contracting for the third quarter. Automotive foundries have curtailed operations to some extent and other melters, notably in New England and in the Pittsburgh district, will carry second quarter iron into the third quarter, but pig iron consumption, as a whole, is well sustained except in the South. Southern furnaces are exerting increased pressure for sales in the North. Silicon differentials have been waived on southern Ohio business, and shading of the base price of \$15, Birmingham, is reported more frequent. Plans of Alabama producers to reach the Philadelphia district under a new rail and barge rate, effective June 15, are causing some concern among eastern Pennsylvania furnaces.

Scrap prices at Pittsburgh, although substantially unchanged, have a stronger undertone. Other markets remain weak, with declines of 50c. a ton on heavy melting steel at Philadelphia and 25c. at St. Louis.

Both of THE IRON AGE composite prices are unchanged, pig iron at \$18.71 a ton and finished steel at 2.412c. a lb.

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous,
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:					Finished Steel,				
					Per Lb. to Large Buyers:				

made satisfactorily on previous occasions.

Third quarter prices have not been named on the heavy hot-rolled products, but there is little consumer interest in requirements for that period, except possibly for plates, on which mill commitments are extended well into July. Strip makers are still waiting for an announcement of semi-finished steel prices before naming their third quarter quotations. However, changes are unlikely on strips, bars, shapes and plates. Makers of blue annealed sheets have written a few third quarter contracts at the recently announced price schedule.

Consumers of pig iron are slow in making known their future requirements, and scattered sales during the week have not been large in the aggregate. The entering of the market by the Pittsburgh merchant interest has probably brought out a slightly larger tonnage than might otherwise have been sold at this time, and there has been little direct competition from Valley furnaces.

Pig Iron.—Buying during the last week has been confined largely to lots of 1000 tons and less, and total bookings have not been very heavy. Sales have resulted more often from the pressure of sellers than from actual consumer interest, as foundries in the district seem to be hesitant in making known their requirements for the summer quarter. In some cases, users will not have specified fully against present contracts by July 1, as the steel foundries and makers of rolling mill equipment are the only large users of pig iron in this district which have been particularly active during the spring. The entrance into the market of the merchant producer in the Pittsburgh district has also been somewhat disturbing to the price situation, and, although recent transactions have generally been made at the quoted schedules, it is too early to ascertain just what effect the blowing in of the Neville Island furnace, now scheduled for June 1, will have upon the market. This furnace will make all grades of iron except Bessemer and is quoting in Allegheny County furnace prices 50c. over the Valley fur-

Warehouse Prices, f.o.b. Pittsburgh

	Base per Lb.
Plates	3.00c.
Structural shapes	3.00c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.75c.
Cold-finished and screw stock—	
Rounds and hexagons	3.60c.
Squares and flats	4.10c.
Bands	3.25c.
Hoops	4.25c.
Black sheets (No. 24), 25 or more bundles	3.80c.
Galv. sheets (No. 24), 25 or more bundles	4.55c.
Blue ann'd sheets (No. 10), 1 to 10 sheets	3.45c.
Galv. corrug. sheets (No. 28), per square	\$4.43
Spikes, large	3.40c.
Small	3.80c. to 5.25c.
Boat	3.80c.
Track bolts, all sizes, per 100 count	60 per cent off list
Machine bolts, 100 count	60 per cent off list
Carriage bolts, 100 count	60 per cent off list
Nuts, all styles, 100 count	60 per cent off list
Large rivets, base per 100 lb.	\$3.50
Wire, black soft ann'd, base per 100 lb.	\$3.00 to 3.10
Wire, galv. soft, base per 100 lb.	3.00 to 3.10
Common wire nails, per keg	3.00
Cement coated nails, per keg	3.05

nance quotations. In the territory west of Pittsburgh the Valley base prices will be used. Sales of Bessemer have been made in this district during the week at \$19, Valley, but on other transactions the delivered price has been determined by the Neville furnace quotation, plus the freight rate to the consuming point. Valley furnaces have not competed for any substantial part of this business, as most of the purchases were made without general inquiry. Sales in the immediate Valley district have been at \$18.50 for foundry and basic iron and \$19 for malleable.

Prices per gross ton, f.o.b. Valley furnace:	
Basic	\$18.50
Bessemer	19.00
Gray forge	18.00
No. 2 foundry	18.50
No. 3 foundry	18.00
Malleable	19.00
Low phosph., copper free	27.00

Freight rate to Pittsburgh or Cleveland district, \$1.76.

Prices per gross ton f.o.b. Pittsburgh district furnace:	
Basic	\$19.00
No. 2 foundry	19.00
No. 3 foundry	18.50
Malleable	19.50

Freight rates to points in Pittsburgh district range from 63c. to \$1.13.

Semi-Finished Steel.—The output of unfinished steel in this district is now well adjusted to the demands of finishing mills. Non-integrated users of sheet bars are still pressing for deliveries and would be able to utilize additional tonnage, but little business is now being turned down because of a lack of crude steel. In nearby districts occasional reports are heard of temporary shortages of semi-finished steel occasioned by sudden curtailment in open-hearth capacity, as the intense activity of the last three months is telling on equipment. However, repairs are being made quickly, as the plans of most mills call for unabated operations for at least another month and interruptions are immediately felt in the closely adjusted schedules of the finishing mills. Reserve supplies of unfinished steel were exhausted several weeks ago and there has been no opportunity to build them up again. No announcement has yet been made regarding prices for the next quarter, although the general supposition continues that \$36, Pittsburgh or Youngstown, the present asking price on billets, slabs and sheet bars, will apply on third-quarter contract tonnage. Makers of sheets who must depend on outside sources for their raw steel are opposing this quotation in view of the fact that sheet prices are not being advanced, and strip makers are faced with diminished profits unless higher prices for their products are obtained. Current demand for wire rods is more than satisfactory, and the present contract price of \$42, Pittsburgh or Cleveland, is expected to be retained for the next quarter.

Bars, Plates and Shapes.—Releases against contracts during the last week show little if any falling off from previous weeks, and mill backlogs at the end of the month will show very little contraction as compared with the end of April. In plates commitments are somewhat heavier than they were a month ago. There has been little change in bars. Some companies report a somewhat lighter demand for shapes, and although bookings of fabricated structural steel in the immediate Pittsburgh district have been rather light during May, the activity in territory served by local fabricat-

THE IRON AGE Composite Prices

Finished Steel

May 28, 1929, 2.412c. a Lb.

One week ago	2.412c.
One month ago	2.412c.
One year ago	2.348c.
10-year pre-war average	1.689c.

Based on steel bars, beams, tank plates, wire, rails, black pipe and black sheets. These products make 87 per cent of the United States output of finished steel.

High		Low	
1929	2.412c., April 2:	2.391c., Jan. 8	
1928	2.391c., Dec. 11:	2.314c., Jan. 3	
1927	2.453c., Jan. 4:	2.293c., Oct. 25	
1926	2.453c., Jan. 5:	2.403c., May 18	
1925	2.560c., Jan. 6:	2.396c., Aug. 18	

Pig Iron

May 28, 1929, \$18.71 a Gross Ton

One week ago	\$18.71
One month ago	18.58
One year ago	17.39
10-year pre-war average	15.72

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

High		Low	
1929	\$18.71, May 14:	\$18.29, March 19	
1928	18.59, Nov. 27:	17.04, July 24	
1927	19.71, Jan. 4:	17.54, Nov. 1	
1926	21.54, Jan. 5:	19.46, July 13	
1925	22.50, Jan. 13:	18.96, July 7	

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c.
F.o.b. Chicago.....	2.05c. to 2.15c.
Del'd Philadelphia.....	2.27c.
Del'd New York.....	2.29c.
Del'd Cleveland.....	1.95c. to 2.00c.
F.o.b. Cleveland.....	1.95c. to 2.00c.
F.o.b. Lackawanna.....	2.05c.
F.o.b. Birmingham.....	2.15c.
C.I.F. Pacific ports.....	2.35c.
F.o.b. San Francisco mills.....	2.35c. to 2.40c.

Billet Steel Reinforcing

F.o.b. Pittsburgh mills, 40, 50, 60-ft.....	2.05c.
F.o.b. Pittsburgh mills, cut lengths.....	2.30c.
F.o.b. Birmingham, mill lengths.....	2.15c.

Rail Steel

F.o.b. mills, east of Chicago dist.....	1.85c. to 1.90c.
F.o.b. Chicago Heights mill.....	1.95c.
Del'd Philadelphia.....	2.27c.

Iron

Common iron, f.o.b. Chicago.....	2.05c. to 2.10c.
Refined iron, f.o.b. P'gh mills.....	2.75c.
Common iron, del'd Philadelphia.....	2.12c.
Common iron, del'd New York.....	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c.
F.o.b. Chicago.....	2.05c.
F.o.b. Birmingham.....	2.15c.
Del'd Cleveland.....	2.14c.
Del'd Philadelphia.....	2.15c.
F.o.b. Coatesville.....	2.05c.
F.o.b. Sparrow Point.....	2.05c.
F.o.b. Lackawanna.....	2.05c.
Del'd New York.....	2.22 1/2 c.
C.I.F. Pacific ports.....	2.20c. to 2.30c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill.....	1.95c.
F.o.b. Chicago.....	2.05c. to 2.15c.
F.o.b. Birmingham.....	2.15c.
F.o.b. Lackawanna.....	2.05c.
F.o.b. Bethlehem.....	2.05c.
Del'd Cleveland.....	2.14c.
Del'd Philadelphia.....	2.01c. to 2.06c.
Del'd New York.....	2.14 1/2 c.
C.I.F. Pacific ports.....	2.35c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh.....	2.00c.
Wider than 6 in., P'gh.....	1.90c.
6 in. and narrower, Chicago.....	2.20c.
Wider than 6 in., Chicago.....	2.10c.
Cooperage stock, P'gh.....	2.20c.
Cooperage stock, Chicago.....	2.30c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill.....	2.30c.
Bars, f.o.b. Chicago.....	2.30c.
Bars, Cleveland.....	2.35c.
Shafting, ground, f.o.b. mill.....	2.65c. to 3.60c.
Strips, P'gh.....	2.75c. to 2.85c.
Strips, Cleveland.....	2.75c. to 2.85c.
Strips, del'd Chicago.....	3.05c. to 3.15c.
Strips, Worcester.....	2.90c. to 3.00c.
Fender stock, No. 20 gage, Pitts- burgh or Cleveland.....	4.25c. to 4.35c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland, to jobbers and retailers.)

	Base per Keg
Wire nails.....	\$2.65 to \$2.75
Galvanized nails.....	4.65 to 4.75
Galvanized staples.....	3.35 to 3.45
Polished staples.....	3.10 to 3.20
Cement coated nails.....	2.65 to 2.75

Base per 100 Lb.

Bright plain wire, No. 6 to No. 9 gage.....	\$2.50 to \$2.60
Annealed fence wire.....	2.65 to 2.75
Spring wire.....	3.50 to 3.60
Galv'd wire, No. 9.....	3.10 to 3.20
Barbed wire, galv'd.....	3.30 to 3.40
Barbed wire, painted.....	3.05 to 3.15
Woven wire fence (per net ton to retailers).....	65.00

Chicago district mill and delivered Chicago prices are \$1 per ton above the foregoing. Birmingham mill prices \$3 a ton higher; Worcester, Mass., (wire) mill \$2 a ton higher on production of that plant; Duluth, Minn., mill \$2 a ton higher; Anderson, Ind., \$1 higher.

Cut Nails

Per 100 Lb.

Carloads, Wheeling, Reading or North- umberland, Pa.	\$2.70
Less carloads, Wheeling or Reading.....	2.80

Light Plates

No. 10, blue annealed, f.o.b. P'gh.....	2.20c.
No. 10, blue annealed, f.o.b. Chicago dist.....	2.30c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh.....	2.35c.
No. 13, f.o.b. Chicago dist.....	2.45c.
No. 13, del'd Philadelphia.....	2.67c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh.....	2.85c. to 2.95c.
No. 24, f.o.b. Chicago dist. mill.....	3.05c.
No. 24, del'd Philadelphia.....	3.17c. to 3.27c.
No. 24, f.o.b. Birmingham.....	3.00c. to 3.10c.

Metal Furniture Sheets

No. 24, f.o.b. P'gh.....	4.10c. to 4.20c.
--------------------------	------------------

Galvanized

No. 24, f.o.b. Pittsburgh.....	3.60c. to 3.70c.
No. 24, f.o.b. Chicago dist. mill.....	3.80c.
No. 24, del'd Cleveland.....	3.79c. to 3.89c.
No. 24, del'd Philadelphia.....	3.92c. to 4.02c.
No. 24, f.o.b. Birmingham.....	3.75c. to 3.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh.....	3.00c.
No. 28, f.o.b. Chicago dist. mill.....	3.10c.

Automobile Body Sheets

No. 28, f.o.b. Pittsburgh.....	4.10c.
--------------------------------	--------

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill.....	4.00c.
---	--------

Vitreous Enameling Stock

No. 24, f.o.b. Pittsburgh.....	3.90c.
--------------------------------	--------

Tin Plate

Per Base Box

Standard cokes, f.o.b. P'gh district mills.....	\$5.35
Standard cokes, f.o.b. Gary.....	5.45

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.\$11.20	25-lb. coating I.C.\$16.70
15-lb. coating I.C. 14.00	30-lb. coating I.C. 17.75
20-lb. coating I.C. 15.30	40-lb. coating I.C. 19.85

Alloy Steel Bars

(F.o.b. makers' mill)

Alloy Quality Bar Base, 2.65c. to 2.75c. per Lb.

S.A.E. Series Numbers

	Alloy	Differential
2000 (1/2% Nickel).....	0.25	
2100 (1 1/4% Nickel).....	0.55	
2300 (3/4% Nickel).....	1.50	
2500 (5% Nickel).....	2.25	
3100 Nickel Chromium.....	0.55	
3200 Nickel Chromium.....	1.35	
3300 Nickel Chromium.....	3.80	
3400 Nickel Chromium.....	3.20	
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum).....	0.50	
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum).....	0.70	
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel).....	1.05	
5100 Chromium Steel (0.60 to 0.90 Chromium).....	0.35	
5100 Chromium Steel (0.80 to 1.10 Chromium).....	0.45	
5100 Chromium Spring Steel.....	0.20	
6100 Chromium Vanadium Bars.....	1.20	
6100 Chromium Vanadium Spring Steel.....	0.95	
9250 Silicon Manganese Spring Steel (flat).....	0.25	
Rounds and squares.....	0.50	
Chromium Nickel Vanadium.....	1.50	
Carbon Vanadium.....	0.95	

Above prices are for hot rolled steel bars, forging quality. The ordinary differential for cold-drawn bars is 3/4c. per lb. higher. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4 down to and including 2 1/2 in. squares, the price is \$5 a gross ton above the 4 x 4 billet price.

Slabs with sectional area of 16 in. or over carry the billet price; slabs with sectional area of 12 in. to 16 in. carry a \$5 extra above the billet price and slabs with a sectional area under 12 in. carry the bar price.

Band sizes are 40c. per 100 lb. higher.

Rails

Per Gross Ton

Standard, f.o.b. mill.....	\$43.00
Light (from billets), f.o.b. mill.....	36.00
Light (from rail steel), f.o.b. mill.....	34.00
Light (from billets), f.o.b. Ch'go mill.....	36.00

Track Equipment

Base per 100 Lb.

Spikes, 3/4 in. and larger.....	\$2.80
Spikes, 1/2 in. and smaller.....	2.80
Spikes, boat and barge.....	3.00
Tie plates, steel.....	2.15

Angle bars.....	\$2.75
Track bolts, to steam railroads.....	\$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count.....	70 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
1/8	45	19 1/2	1/4 and 3/8	+11	+36
1/4 to 3/8 ..	51	25 1/2	3/4	23	5
1/2	56	42 1/2	1	28	11
3/4	60	48 1/2	1 and 1 1/4 ..	31	15
1 to 3	62	50 1/2	1 1/4 and 2 ..	35	18

Lap Weld

2.....	55	43 1/2	2.....	23	9
2 1/2 to 6.....	59	47 1/2	2 1/2 to 3 1/2.....	28	13
7 and 8.....	56	43 1/2	4 to 6.....	30	17
9 and 10.....	54	42 1/2	7 and 8.....	29	16
11 and 12.....	53	40 1/2	9 to 12.....	26	11

Butt Weld, extra strong, plain ends

1/2.....	41	24 1/2	1/2 and 3/4.....	+13	+48
3/4.....	47	30 1/2	3/4.....	28	7
1.....	53	42 1/2	1.....	28	12
1 1/4.....	58	47 1/2	1 to 2.....	34	18
1 to 1 1/4.....	60	49 1/2			
2 to 3.....	61	50 1/2			

Lap Weld, extra strong, plain ends

2.....	53	42 1/2	1/2.....	29	13
2 1/2 to 4.....	57	46 1/2	2 1/2 to 4.....	34	20
4 1/2 to 6.....	56	45 1/2	4 1/2 to 6.....	33	19
7 to 8.....	52	39 1/2	7 and 8.....	31	17
9 and 10.....	45	32 1/2	9 to 12.....	21	8
11 and 12.....	44	31 1/2			

On carloads the above discounts on steel pipe are increased on block by one point, with supplementary discount of 5%, and on galvanized by 1 1/2 points, with supplementary discount of 5%. On iron pipe, both black and galvanized the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2 1/2%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

	Steel	Charcoal Iron
2 in. and 2 1/2 in.....	40	1 1/2 in..... 1
2 1/2 in.—2 3/4 in.....	48	1 3/4 in..... 3
3 in.....	54	2 in.—2 1/4 in..... 13
3 1/4 in.—3 3/4 in.....	56	2 1/4 in.—2 3/4 in..... 16
4 in.....	59	3 in..... 17
4 1/2 in. to 6 in.....	48	3 1/4 in. to 3 3/4 in..... 18
		4 in..... 20
		4 1/2 in..... 21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.....	68	3 in..... 48
1 1/4 to 1 1/2 in.....	55	3 1/4 to 3 3/4 in..... 50
1 3/4 in.....	39	4 in..... 53
2 to 2 1/4 in.....	34	4 1/2, 5 and 6 in..... 42
2 1/2 to 2 3/4 in.....	42	

Hot Rolled

2 and 2 1/4 in.....	40	2 1/2 to 3 1/4 in..... 56
2 1/2 and 2 3/4 in.....	48	4 in..... 59
3 in.....	54	4 1/2, 5 and 6 in..... 48

Rebond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard are gage take mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30%, base (carloads).....	55
Carbon, 0.30% to 0.40%, base.....	50
Plus differentials for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.	

ing shops does not seem to be diminishing. One or two of the larger interests are operating at practical capacity and the average of the entire district is rather high. Barge builders are also well occupied. About 2000 tons of shapes will be required for a Pennsylvania Railroad freight terminal in Pittsburgh, which is expected to be let this week. Shipments of bars, plates and shapes during May will be about equal to those of the previous month, and deliveries now average about four weeks on bars, six to eight weeks on plates and three to four weeks on shapes. Reinforcing bars are still finding an excellent demand and mills are experiencing considerable difficulty in making shipments on time because of the pressure for deliveries of merchant bars. Less price shading is reported in the last few weeks and the minimum quotation of 1.95c., Pittsburgh, is being adhered to on the general run of orders. It is generally thought that this price will be reaffirmed for third quarter business.

Rails and Track Supplies.—Tonnage releases on contract business are coming in regularly and mills are still well occupied. Shipments during May have been considerably ahead of the same period last year, although somewhat under the high rate of March and April this year. On some products there is still considerable pressure for deliveries. Prices are well maintained on track supplies, although there is occasional shading on light rails to meet the competition of rerolled rails. Movement of light rails is very slow, largely on account of the unsatisfactory conditions in the mining industry.

Wire Products.—Demand for manufacturers' wire continues to hold up well and slight declines in the requirements of the automobile industry are offset by increases elsewhere. Improved weather conditions in various parts of the country are reflected in better demand from jobbers for fencing and barbed wire, products which have been held up thus far by the late spring. Jobbers' stocks are now reported to be moving more rapidly and supplementary orders are more numerous. In the immediate Pittsburgh district some improvement is reported in the demand for wire nails. However, nails generally show little betterment. Prices on nails and wire are fairly well established in this district.

Tubular Goods.—Following a period of some activity in the placing of line pipe, the market for this material is rather quiet, and for the first time in several months there are no outstanding jobs before the trade. Mills making lapweld pipe are fairly well engaged and have comfortable backlogs on some of the larger sizes. Better reports from the oil regions regarding the summer's activity are not yet reflected in any improvement in the demand for drilling pipe and kindred products. The beginning of a decline in automobile production schedules is

being felt in specifications for mechanical tubing, although shipments during May will be fully equal to the heavy movement of both March and April.

Sheets.—Tonnage releases on sheets during the last week were fully equal to recent levels and the month will likely show little if any shrinkage in mill backlogs. Specifications from the automobile industry are at last beginning to indicate a definite downward trend in production, although some companies will enter June with no reduction in recent high operating quotas. The introduction of new models by some producers has offset declines in old schedules, but it is now definitely assured that late June and July sheet tonnages going to the Michigan plants will be considerably diminished. A number of companies supplying the automobile trade, who are in close touch with the situation in Detroit, predict a resumption of the present activity in August. Sheet mill operations in the last week were maintained at the higher rate achieved in the previous seven days. Curtailed production schedules during the first two weeks of the month occasioned by a shortage of semi-finished steel will have their effect on the total shipments during May, which will be somewhat less than in March or April. Pressure for shipments of some of the common finishes of sheets continues, particularly in the blue annealed product. The new classifications on blue annealed sheets have been generally adopted and some third-quarter contracts have been written at the new schedules. However, there has been little third-quarter contracting on sheets in general, as consumers still have about three weeks to specify against present contracts and are not inclined to commit themselves for a longer period.

Tin Plate.—While specifications on tin plate contracts continue to decline, this is largely because present contracts have been fully specified in many cases. Shipments during May, however, have been practically equal to those of March and April. Operations in this and nearby districts declined again last week, the leading interest having run its mills at approximately 89 per cent of capacity. Declines are also reported in the Wheeling district, where a shortage of semi-finished steel was said to have been an influential factor. Reports on crop conditions during the last week have been generally more encouraging. Estimates of the damage to the California fruit crop caused by early frosts in that State have again been revised downward and it is now believed they will be of little importance as far as the total pack in that district is concerned. Second-half tin plate contracts are now being renewed at the recent price, or \$5.35 per base box, Pittsburgh.

Cold-Finished Steel Bars.—Shipments of cold-finished steel bars during May will show a slight decline as compared with April and backlogs have been considerably reduced during

the last three or four weeks. Specifications are still coming in at a fair rate and are just about equal to shipments with some makers. New business is satisfactory and the price of 2.30c., Pittsburgh, is well maintained on the general run of business.

Hot-Rolled Strip.—Specifications during the present month are going to show a comfortable increase over April. Shipments are holding up well, although advance releases from the automobile industry are reflecting a gradual decline in production. Delivery promises of Pittsburgh district mills still average about four weeks, although slightly better shipments may be obtained on the wider sizes. Third-quarter prices have not been announced, and although an advance is not generally desired by the mills, the retention of the present quotations on semi-finished steel might force non-integrated makers to make an advance.

Cold-Rolled Strip.—Slight declines in the specifications of important automobile producers are reported by makers of cold-rolled strip, but tonnage releases are still generally satisfactory. Deliveries are not so extended as they have been, and only the occasional difficulty of obtaining material from the hot mills is holding up shipments for more than three or four weeks. Third-quarter prices have not yet been announced, but an advance is unlikely. Consumers are showing little interest in their requirements for that period.

Bolts, Nuts and Rivets.—Bolt and nut makers are still operating at about 75 per cent of rated capacity, the general average tending to run above rather than below this figure. Demand is well maintained and so well diversified that any pronounced falling off seems unlikely in the near future. The railroads are requiring a good share of shipments, but demand from the jobbing trade is well maintained. Bolts and nuts are well established at 70 per cent off list, and large rivets are quoted at \$3.10 per 100 lb., Pittsburgh or Cleveland.

Coal and Coke.—Firing of additional ovens by the Frick company has brought this company's active capacity to a higher figure than usual at this season, but it is generally thought that this is occasioned by repairs at the Clairton, Pa., ovens, which normally supply coke to a number of blast furnaces in this district. Market conditions show little change and furnace coke is still quotable at \$2.75 to \$2.85, Connellsville. Shipments of foundry coke are rather light and the coming of warm weather may lead to further curtailment in the requirements of the foundries. The coal market is still quiet and there are no signs of price recovery. Production declined again last week and supplies of coal at the mines are more than adequate.

Old Material.—Despite another week of light consumer buying, the

(Concluded on page 1523)

Semi-Finished Steel, Raw Materials, Bolts and Rivets

Mill Prices of Semi-Finished Steel

Billets and Blooms

	Per Gross Ton
Rerolling, 4 in. and under 10 in., Pittsburgh	\$36.00
Rerolling, 4 in. and under 10 in., Youngstown	36.00
Rerolling, 4 in. and under 10 in., Cleveland	36.00
Rerolling, 4 in. and under 10 in., Chicago	37.00
Forging quality, Pittsburgh	41.00

Sheet Bars

(Open Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	\$36.00
Youngstown	36.00
Cleveland	36.00

Slabs

(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	\$36.00
Youngstown	36.00
Cleveland	36.00

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.85c. to 1.90c.
Universal	1.85c. to 1.90c.
Sheared	1.85c. to 1.90c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	\$42.00
Cleveland	42.00
Chicago	43.00

Prices of Raw Material

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	\$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40
Foreign Ore, c.i.f. Philadelphia or Baltimore	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algerian	10.00c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic Swedish, average 65% iron	9.00c.
Manganese ore, washed, 52% manganese, from the Caucasus	33.00c. to 35.00c.
Manganese ore, Brazilian, African or Indian, basic 50%	33.00c. to 35.00c.
Tungsten ore, high grade, per unit, in 60% concentrates	\$16.25 to \$16.50
Chrome ore, 45 to 50% Cr ₂ O ₃ , crude, c.i.f. Atlantic seaboard	\$22.00 to \$24.00
Molybdenum ore, 85% concentrates of MoS ₂ , delivered	50c. to 55c.

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	\$2.75 to \$2.85
Foundry, f.o.b. Connellsville prompt	3.75 to 4.85
Foundry, by-product, Ch'go ovens	8.00
Foundry, by-product, New England, del'd	11.00
Foundry, by-product, Newark or Jersey City, delivered	9.00 to 9.40
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry by-prod., del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	\$1.25 to \$1.75
Mine run coking coal, f.o.b. W. Pa. mines	1.50 to 1.75
Gas coal, 1/4-in., f.o.b. Pa. mines	1.90 to 2.00
Mine run gas coal, f.o.b. Pa. mines	1.65 to 1.75
Steam slack, f.o.b. W. Pa. mines	80c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	\$105.00
Foreign, 80%, Atlantic or Gulf port, duty paid	105.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	\$31.00 to \$34.00
Domestic, 16 to 19%	29.00 to 32.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	\$83.50
75%	130.00
	Per Gross Ton Furnace
10%	\$35.00
11%	37.00
	Per Gross Ton Furnace
12%	\$39.00
14 to 16%	45.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton
10%	\$31.00
11%	33.00
	Per Gross Ton
12%	\$35.00

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton
6%	\$24.00
7%	25.00
8%	26.00
9%	27.00
	Per Gross Ton
10%	\$29.00
11%	31.00
12%	33.00

Other Ferroalloys

Ferrotungsten, per lb., contained metal del'd	\$1.35 to \$1.50
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	\$11.00c.
Ferrovandium, per lb. contained vanadium, f.o.b. furnace	\$3.15 to \$3.65
Ferrocobaltitium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	\$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton	\$91.00
Ferrophosphorus, electric 24%, f.o.b. Aniston, Ala., per gross ton	\$122.50

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	\$18.00
No. 2 lump, Illinois and Kentucky mines	20.00
Foreign, 85% calcium fluoride, not over 5% silica, c.i.f. Atlantic port, duty paid	\$18.00 to \$18.50
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/4% silica, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works
	High-Heat Duty Brick
	Intermediate Heavy Duty Brick
Pennsylvania	\$43.00 to \$46.00
Maryland	43.00 to 46.00
New Jersey	50.00 to 65.00
Ohio	43.00 to 46.00
Kentucky	43.00 to 46.00
Missouri	43.00 to 46.00
Illinois	43.00 to 46.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	\$48.00
Chicago	52.00
Birmingham	50.00
Silica clay, per ton	\$8.50 to 10.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	\$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Standard size	45.00

Chrome Brick

	Per Net Ton
Standard size	\$45.00

Mill Prices of Bolts, Nuts, Rivets and Set Screws

Bolts and Nuts

Per 100 Pieces

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
Hot-pressed nuts, blank or tapped, hexagons	70
C.p.e. and t. square or hex. nuts, blank or tapped	70
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.
†Bolts with rolled thread up to and including 1/4 in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

Per Cent Off List

Semi-finished hexagons nuts	70
Semi-finished hexagons castellated nuts, S.A.E.	70
Stove bolts in packages, Pittsburgh	80, 10 and 5
Stove bolts in packages, Chicago	75, 20, 10 and 5
Stove bolts in packages, Cleveland	75, 20, 10 and 5
Stove bolts in bulk, Pittsburgh	80, 10, 5 and 2 1/2
Stove bolts in bulk, Chicago	75, 20, 10, 5 and 2 1/2
Stove bolts in bulk, Cleveland	75, 20, 10, 5 and 2 1/2
Tire bolts	60, 5 and 5

Discounts of 70 per cent off on bolts and nuts applied on carload business. For less than carload orders discounts of 55, 60 per cent apply.

Large Rivets

(1/2-In. and Larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	\$3.10
F.o.b. Chicago	3.20

Small Rivets

(1/8-In. and Smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 10
F.o.b. Cleveland	70 and 10
F.o.b. Chicago	70 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10 and 5
Milled standard set screws, case hardened	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S. thread	85
Upset hex. cap screws, S.A.E. thread	85
Upset set screws	80, 10 and 5
Milled studs	70

Chicago

Finished Steel Sales Show No Decline—Foundries Making Automobile Castings Less Busy

CHICAGO, May 28.—Consumers of finished steel continue to look ahead, with the result that sales for the week were a trifle heavier than the weekly average so far this year. Buyers are taking steel mill products at an undiminished rate, thereby supporting output at full rated ingot capacity. Blast furnaces now producing number 29 out of 36 in this district. One mill, finding the use of cold metal and scrap too costly, is considering the lighting of another furnace.

The tendency so far in opening third quarter books is to retain present prices. Future business is being accepted in rail steel bars at present levels, and several producers of wire and wire products, cold-rolled strips and hot-rolled strips announce unchanged prices for the coming quarter. Bolt, nut and rivet manufacturers, though they have not prepared new contracts, are holding to present prices for new business to be shipped after July 1.

Taken as a whole, the industrial situation in this district has varied little in the past week. Change of models is acting as a check on output by automobile parts makers. Foundries and forge shops so affected find it comparatively easy to take up slack by supplying the needs of railroad car builders. Sales of farm implements are reported as being high, and there is still no indication of lessened steel demand during the early part of the inventory period.

New business placed by the railroads is light, though there is talk of 5000 cars that may come into the market and also an attractive tonnage of rails.

The building industry, which for long has been dragging bottom, is markedly brighter as over 25,000 tons of new business comes before local fabricators.

Pig Iron.—Two cargoes of Lake Erie iron have arrived this week for consumers in this district. One was unloaded at Chicago docks and one at Milwaukee. Since navigation opened five boatloads of Lake Erie iron and one cargo each of English low phosphorus iron and spiegeleisen have been received here. A slight decrease in foundry iron shipments is noted, the change coming about for the most part in foundries that make castings for the automobile trade. Output of gray iron foundries is somewhat spot-

ty. Some melters find business less active while others have heavier order books than at the middle of the month. Shipments of Northern iron are still above production, and there has been a further shrinkage in furnace stocks. It is significant that the holdover tonnage at the end of May is smaller than at the end of April. New business from car builders and farm implement manufacturers is tending to even the low spots in malleable foundries. The charcoal iron market is steady.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25..	\$20.00
N'th'n No. 1 fdy., sil. 2.25 to 2.75..	20.50
Malleable, not over 2.25 sil.....	20.00
High phosphorus	20.00
Lake Super. charcoal, sil. 1.50.....	27.04
So'th'n No. 2 fdy. (all rail).....	\$21.01 to 21.51
Low phos., sil. 1 to 2, copper free..	29.50
Silvery, sil. 3 per cent.....	30.79
Bess. ferro-silicon, 14-15 per cent...	46.29

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

Ferroalloys.—The bulk of the cargo of English spiegeleisen recently received at Chicago has been distributed to consumers against orders placed last winter. The ferromanganese market is dull in so far as purchases are concerned, but shipments are at a high rate.

Prices delivered Chicago: 80 per cent ferromanganese, \$112.56; 50 per cent ferro-silicon, \$83.50 to \$88.50; spiegeleisen, 19 to 21 per cent, \$40.76.

Cast Iron Pipe.—From the standpoint of sales, this market remains unusually quiet. Fresh inquiry, though it is somewhat improved, is widely scattered and individual tonnages are small. The bulk of business in prospect emanates from municipalities. Railroads, public utilities and other private buyers take little interest in the market. It is reported that bids had been rejected by Mozart, Mo., and that the 150 tons previously sought will not be readvertised. Muskegon, Mich., will close this week for 9500 ft. of 6-in. pipe. Pipe manufacturers are looking forward to an inquiry for a filter plant at Cedar Rapids, Iowa. Oak Park, Ill., will buy 200 tons of 6 to 12-in. pipe, and Dearborn, Mich., will open bids May 29 on 400 tons of 6 and 8-in. pipe. Lexington, Ohio, is in need of 200 tons of 4 to 8-in.

pipe, and Irwin, Iowa, will buy 115 tons of 4 to 8-in. pipe.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, \$44.20 to \$46.20; 4-in., \$48.20 to \$50.20; Class A and gas pipe, \$3 extra.

Rails and Track Supplies.—This market has been quiet except for orders for several lots of track fastenings, which aggregate 2500 tons. Several sizable tonnages of secondary rails are expected to come before the trade at an early date. Output by rail mills is at a capacity consistent with the supply of raw steel. The light rail market is dull.

Prices f.o.b. mill, per gross ton: Standard section open-hearth and Bess. rails, \$43; light rails, rolled from billets, \$36. *Per lb.:* Standard railroad spikes, 2.80c.; track bolts with square nuts, 3.80c.; steel tie plates, 2.15c.; angle bars, 2.75c.

Sheets.—Third quarter contracting is gaining headway. Local mills are well sold for eight weeks. Output is at 85 per cent of capacity, but this may be cut because of the warm weather prevailing in the Chicago area. Deliveries range from eight to 10 weeks on blue annealed sheets and from seven to eight weeks on the black and galvanized products. Jobbers are drawing heavily on mills. Shipments to the roofing trade are larger, though business from this source has been measurably below that in previous years.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 3.10c.; No. 24 galv., 3.85c.; No. 10 blue ann'd, 2.35c. *Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.*

Reinforcing Bars.—Foremost among awards this week is 1250 tons for the county court building in Milwaukee. An inquiry is out in Chicago for 1200 tons for the Burnham Avenue viaduct. This market is more active, but it lags behind May, last year. Building permits issued in Chicago are 20 per cent below those of the first five months of 1928. Contractors are hungry for work, and competition is keen both for general contracts and for furnishing reinforcing bars. Prices at warehouses are unsettled.

Wire Products.—Producers of wire and wire products expect to announce third quarter prices before the end of this week. In the meantime, prices are showing strength in a market in which spot sales are numerous. Specifications from all sources bulk large, being fully equal to production, which stands between 70 and 75 per cent of capacity. Demand for electrical wire is spotty and in smaller aggregate volume than at the beginning of the month. The wire rope market is dull. Shipments of reinforcing mesh compare favorably with previous years at this time. Orders for this commodity indicated a demand above normal for May, but weather delayed road work, especially in rural districts, and as a result shipments have not been as heavy as producers had expected. Jobbers are finding business a trifle duller as the season advances. Nails are moving steadily, but in smaller volume than

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes.....	3.10c.
Soft steel bars.....	3.00c.
Reinforc'g bars, billet steel.....	2.10c. to 2.40c.
Reinforc'g bars, rail steel.....	1.90c. to 2.05c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Bands (1/4 in. in Nos. 10 and 12 gages).....	3.20c.
Hoops (No. 14 gage and lighter)...	3.75c.
Black sheets (No. 24).....	4.05c.
Galv. sheets (No. 24).....	4.90c.
Blue ann'd sheets (No. 10).....	3.35c.
Spikes, 1/4 in. and larger.....	3.55c.
Track bolts.....	4.55c.
Rivets, structural.....	4.00c.
Rivets, boiler.....	4.00c.
Per Cent Off List	
Machine bolts.....	60
Carriage bolts.....	60
Coach or lag screws.....	60
Hot-pressed nuts, sq., tap, or blank..	60
Hot-pressed nuts, hex., tap, or blank..	60
No. 8 black ann'd wire, per 100 lb..	\$3.45
Com. wire nails, base per keg.....	3.20
Cement c'd nails, base per keg.....	3.20

is expected at this time of the year. Crop reports indicate that the season is late throughout most of the country. Specifications from the manufacturing trade are steady.

Structural Material.—This market has taken a turn for the better, and it is estimated that not less than 25,000 tons of new inquiry is before the trade. The Patterson Estate Building, which preliminary estimates indicated would require 5000 tons, will actually take close to 7000 tons. Backlogs at Chicago shops are steadily growing smaller. Competition for pending tonnages is expected to be keen.

Structural shapes may be had in eight to ten weeks. Foremost among awards in the week was 2500 tons for a bridge at Sioux City, Iowa.

Mill prices on plain material, per lb.: 2.05c. to 2.15c. base, Chicago.

Bolts, Nuts and Rivets.—Sellers announce that third quarter contracts will be prepared with unchanged prices. Spot sales are in fair volume and specifications continue to be forwarded at a steady rate. Railroads and car shops are taking larger quantities.

Bars.—Both new buying and specifications for mild steel bars have shown marked improvement in the past week. Road machinery manufacturers are taking liberal quantities for capacity operations and for nearby schedules, which are heavy. Local forgers are busy and have large order books. Prices for soft steel bars are steady at 2.05c. to 2.15c., Chicago. Deliveries are not better than 14 weeks. Reports from the automobile trade are mixed. A drop in employment is reported from Toledo. On the whole, it seems that output of low-priced automobiles is unchanged, but that lighter schedules are in force in plants building medium-priced cars and from which new models are soon to come. Little change is noted in the alloy steel bar market. Backlogs at rail steel bar mills continue to grow as demand expands. Though no official announcement has been made, sellers are accepting third quarter contracts at 1.95c., Chicago Heights.

Old Material.—Influences which recently have been bearing down on prices for heavy tonnage grades of scrap are less in evidence, and there is a greater degree of stability to the market, except in those grades which are used by foundries. Rejections at steel mills are less numerous, as sellers use greater caution in preparing scrap to be shipped to those users. The inflow of country scrap has been checked somewhat, possibly by the rigid inspections insisted upon by large buyers. For the most part, supplies of the various grades are fully adequate to meet consumers' needs. This situation is leading to easier prices for some grades on brokers' trades. Dealers have no difficulty in obtaining more than adequate supplies of cast iron borings, and they are filling old orders with

tonnages purchased at \$10 a gross ton, delivered. The cast iron wheel market is dull, with large supplies available. Foundry grades are soft, with melters holding out of the market. As demand for other foundry supplies is steady, it does not seem that lack of sales of foundry grades of scrap portrays a slowing in the melt in this district. In recent weeks sellers have pressed sales and it is highly probable that most foundries find present commitments fully adequate for their immediate needs. The close ordering of steel and new designs for freight cars are said to have reduced the scrap available from car shops by at least 30 per cent. The Chevrolet division of the General Motors Corporation is offering, for shipment in 30 days 100 cars of borings, 50 cars of hydraulic sheets and 50 cars of machine stop turnings.

Prices deliv'd Chicago district consumers:

Per Gross Ton	
Basic Open-Hearth Grades:	
Heavy melting steel.....	\$15.25 to \$15.75
Shoveling steel.....	15.25 to 15.75
Frogs, switches and guards, cut apart, and misc. rails	16.75 to 17.25
Hydraul. compressed sheets	13.50 to 14.00
Drop forge flashings.....	11.00 to 11.50
No. 1 busheling.....	13.50 to 14.00
Forg'd cast and r'd steel carwheels.....	18.75 to 19.25
Railroad tires, charg. box size.....	18.75 to 19.25
Railroad leaf springs cut apart.....	18.75 to 19.25
Acid Open-Hearth Grades:	
Steel couplers and knuckles	17.00 to 17.50
Coil springs.....	19.00 to 19.50
Electric Furnace Grades:	
Axle turnings.....	15.50 to 16.00
Low phos. punchings.....	17.00 to 17.50
Low phos. plates, 12 in. and under.....	16.50 to 17.00
Blast Furnace Grades:	
Axle turnings.....	11.00 to 11.50
Cast iron borings.....	10.00 to 10.50
Short shoveling turnings..	10.00 to 10.50
Machine shop turnings....	7.25 to 7.75
Rolling Mill Grades:	
Iron rails.....	16.00 to 16.50
Rerolling rails.....	17.50 to 18.00
Cupola Grades:	
Steel rails less than 3 ft..	18.50 to 19.00
Steel rails less than 2 ft..	19.00 to 19.50
Angle bars, steel.....	17.00 to 17.50
Cast iron carwheels.....	14.50 to 15.00
Malleable Grades:	
Railroad.....	18.00 to 18.50
Agricultural.....	15.75 to 16.25
Miscellaneous:	
*Relaying rails, 56 to 60 lb.	23.00 to 25.00
*Relaying rails, 65 lb. and heav.	26.00 to 31.00
Per Net Ton	
Rolling Mill Grades:	
Iron angles and splice bars	15.00 to 15.50
Iron arch bars and transoms.....	21.50 to 22.00
Iron car axles.....	26.50 to 27.00
Steel car axles.....	17.00 to 17.50
No. 1 railroad wrought..	14.00 to 14.50
No. 2 railroad wrought..	13.75 to 14.25
No. 2 busheling.....	7.00 to 7.50
Locomotive tires, smooth..	14.50 to 15.00
Pipes and flues.....	10.00 to 10.50
Cupola Grades:	
No. 1 machinery cast.....	15.00 to 15.50
No. 1 railroad cast.....	14.00 to 14.50
No. 1 agricultural cast....	13.50 to 14.00
Stove plate.....	12.25 to 12.75
Grate bars.....	12.50 to 13.00
Brake shoes.....	11.50 to 12.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Cold-Rolled Strip.—Prices for this commodity are strong, and deliveries are not better than seven to eight weeks. It is probable that third quarter books will be opened before the end of this week. Specifications

have shown a tendency to grow, and they are fully equal to current shipments. Spot purchases are in moderate volume.

Plates.—This market is featured by heavy specifications against old contracts. Car builders' needs are large, and much of the tonnage required for car contracts on hand is still to be ordered out. Shipments of plates for pipe manufacture also are large. Orders for tankage are not impressive, but fresh inquiry for 1000 tons brings the total steel needed for projects that are well under way to between 15,000 and 20,000 tons. The Mexican National Railway has ordered 240 box cars and will buy 800 additional cars of the same type.

Coke.—Forward buying for the last half is brisk at \$8 a ton, f.o.b. local ovens. Shipments of by-product foundry coke are steady.

Detroit Scrap Unchanged

DETROIT, May 28.—There have been no changes in prices on old material during the past week. Despite the high production, material has been moving out of the district steadily. Practically all of the scrap produced in the Detroit area is now being shipped by water to Lake mills and furnaces.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel.....	\$14.00 to \$14.50
Borings and short turnings	9.00 to 9.50
Long turnings.....	7.25 to 7.75
No. 1 machinery cast.....	14.50 to 15.00
Automobile cast.....	16.00 to 16.50
Hydraul. comp. sheets....	14.00 to 14.50
Stove plate.....	9.50 to 10.00
New No. 1 busheling.....	12.00 to 12.50
Old No. 1 busheling.....	11.00 to 11.50
Sheet clippings.....	9.00 to 9.50
Flashings.....	12.00 to 12.50

General Motors to Build Aircraft Engines

The General Motors Corporation has taken over plant and business of Allison Engineering Co., Main and Thirteenth Streets, Indianapolis, manufacturer of airplane engines, reduction gears and other mechanical equipment, and will operate it as a unit of its organization. The property was purchased recently by E. V. Rickenbacker, president of the Indianapolis Motor Speedway Corporation, and others, and has now been transferred to General Motors. An expansion program to cost approximately \$800,000 will be carried out, including installation of additional facilities for the production of Diesel-type aircraft motors, which will form the bulk of the plant's output in future.

Production of pig iron and crude steel in Czechoslovakia was at record level in March, amounting to 138,000 tons and 181,000 tons respectively, according to a cable received by the Department of Commerce from Prague.

New York

Subway Calls for 9500 Tons of Steel—Pig Iron Buyers Delay Third Quarter Contracting

NEW YORK, May 28.—The pig iron market remains quiet, and sales in this district for the week totaled only about 6000 tons. Some melters are plainly bent on delaying their third quarter buying in the hope of getting more favorable prices. Foundry operations are well maintained, although certain plants, identified with the making of heating and sanitary equipment and pipe fittings, have been running at a slackened pace for some time. All told, melters are probably not so busy in this section as in the Central West. Sales of pig iron have been too small to give the market a severe test, and prices are substantially unchanged. Buffalo furnaces have small stocks and, in view of increasing water shipments to Great Lakes ports, are not in pressing need of tonnage at this time. A decline in steel business, of course, might later release more steel works pig iron than is now offered for merchant sale. Relatively little barge iron has been shipped from Buffalo thus far, and the attitude of the navigation companies on rates is said to make a large movement improbable. The only new sizable inquiry calls for 1500 tons of foundry for immediate delivery to an up-State plant. The Thatcher Co., Newark, N. J., is reported sounding out the market. Lake Superior charcoal pig iron shows evidence of weakness for the first time in a long period. A Michigan melter is reported to have bought 150 tons at \$24 a ton, delivered, indicating the waiving of the freight. Heretofore charcoal iron has been sold at \$24, furnace.

Prices per gross ton, delivered New York district:

Buffalo No. 2, fdy., sil.	1.75
to 2.25	\$22.91 to \$23.91
*Buf. No. 2, del'd east.	
N. J.	21.28 to 22.28
East. Pa. No. 2 fdy., sil.	1.75 to 2.25
East. Pa. No. 2X fdy., sil.	2.25 to 2.75
	21.89 to 23.02

Freight rates: \$4.91 from Buffalo, \$1.39 to \$2.52 from eastern Pennsylvania.

*Price delivered to New Jersey cities having rate of \$3.28 a ton from Buffalo.

Reinforcing Bars.—Few sizable awards are reported this week, but distributors are booking an encouraging volume of small business. There is some complaint, however, that pending tonnages of size are slow in being acted on.

Billet steel reinforcing bars in 40, 50 and 60-ft. lengths, 2.05c. per lb., Pittsburgh, and 2.30c. per lb., Pittsburgh warehouse, for cut lengths. Out of New York warehouse, 2.90c. per lb. for lots of 5 tons or more, 3.05c. for lots of 2 to 5 tons and 3.30c. for less than 2 tons, all delivered at job.

Finished Steel.—Steel consumption in this district is undiminished. Consumers are still pressing for deliveries. One large steel producer is taxing its open-hearth capacity so heavily that it has requested some customers to accept Bessemer steel in place of open-hearth. Some sheet

mills have had to turn down offers of tonnage for June shipment. One mill is virtually out of the market on black sheets. A large sheet consumer has specified its requirements as far ahead as September. Final specifications on second quarter contracts will be accepted by most mills until June 15, and much of the tonnage that will be specified cannot be shipped until July or August. Very little third quarter contracting has been done. Prices on plates, shapes and bars for that period have not been formally announced, but some mill representatives have been authorized to take contracts at the second quarter prices. Although some large building projects which were scheduled to go ahead are being held up because of financing difficulties, the volume of structural steel lettings for buildings and other construction work continues heavy. The Hedden Iron Construction Co. will furnish 4600 tons of fabricated steel for an office building on Cedar Street, New York. New inquiry includes 9500 tons for another subway section and 5000 tons for the Lefcourt-Plaza Building in Newark.

Mill prices per lb., deliv'd New York: Soft steel bars, 2.29c.; plates, 2.22½c.; structural shapes, 2.19½c.; bar iron, 2.14c.

Warehouse Business.—Buying from stock is active, especially in structural material. Demand for black and galvanized sheets is fair, and prices are being maintained with only occasional concessions. The well-filled condition of mills continues to bring some sizable orders to jobbers, when consumers are unable to await the deferred deliveries offered by producers.

Cast Iron Pipe.—Prices are still irregular and tonnages pending for municipalities and private users are small. Port Washington, N. Y., has opened bids on about 900 tons of 6 to 12-in. water pipe, and New London, Conn., on about 100 tons of 6-in. Class B pipe. Washington has closed on about 180 tons of water pipe. On May 27, June 1 and June 2 bids will be opened on a total of about 15,000 tons of cast iron water pipe for the Philippines.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, \$35.60 to \$36.60; 4-in. and 5-in., \$38.60 to \$39.60; 3-in., \$45.60 to \$46.60. Class A and gas pipe, \$3 extra.

Coke.—Most consumers of by-product foundry coke have entered into contracts for the second half. About June 10 bids will be opened on an export inquiry for about 700 tons of beehive coke. Standard furnace coke is maintained at \$2.75 to \$2.85 per net ton, Connellsville. Special brands of beehive coke are quoted at \$4.85 per net ton, ovens, or \$8.56, delivered to northern New Jersey, Jersey City and Newark, and \$9.44 to New York and

Brooklyn. By-product coke is quoted at \$9 to \$9.40 per net ton, Newark or Jersey City, and \$10.06, New York or Brooklyn.

Old Material.—Prices of most grades of scrap still show a downward trend, and No. 1 heavy melting steel is definitely off 50c. a ton on the basis of a recent purchase of about 10,000 tons by a Claymont, Del., consumer at

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and structural shapes.....	3.30c.
Soft steel bars, small shapes.....	3.25c.
Iron bars.....	3.24c.
Iron bars, Swed. charcoal.....	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons.....	3.60c.
Flats and squares.....	4.10c.
Cold-roll. strip, soft and quarter	
hard.....	5.15c. to 5.40c.
Hoops.....	4.25c.
Bands.....	3.75c.
Blue ann'd sheets (No. 10).....	3.85c. to 3.90c.
Long terme sheets (No. 24).....	5.80c.
Standard tool steel.....	12.00c.
Wire, black annealed.....	4.50c.
Wire, galv. annealed.....	5.15c.
Tire steel, 1½ x ½ in. and larger.....	3.30c.
Smooth finish, 1 to 2½ x ¼ in.	
and larger.....	3.65c.
Open-hearth spring steel, bases,	
4.50c. to 7.00c.	

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller.....	60
1 x 30 in. and smaller.....	50 to 50 and 10
Carriage bolts, cut thread:	
¾ x 6 in. and smaller.....	60
¾ x 20 in. and smaller.....	50 to 50 and 10
Coach screws:	
¾ x 6 in. and smaller.....	60
1 x 6 in. and smaller.....	50 to 50 and 10
Boiler Tubes—	Per 100 Ft.
Lap welded, 2-in.....	\$17.33
Seamless steel, 2-in.....	20.24
Charcoal iron, 2-in.....	25.90
Charcoal iron, 4-in.....	67.00

	Standard Steel—	Black	Galv.
¾-in. butt.....	46	29	
¾-in. butt.....	51	37	
1-3-in. butt.....	53	39	
2½-6-in. lap.....	48	35	
7 and 8-in. lap.....	44	17	
11 and 12-in. lap.....	37	12	
Wrought Iron—			
¾-in. butt.....	5	+19	
¾-in. butt.....	11	+9	
1-1½-in. butt.....	14	+6	
2-in. lap.....	5	+14	
3-6-in. lap.....	11	+6	
7-12-in. lap.....	3	+16	

	Prime	Seconds
Coke, 100 lb. base box....	\$6.45	\$6.20
Charcoal, per Box—	A	AAA
IC.....	\$9.70	\$12.10
IX.....	12.00	14.25
IXX.....	13.90	16.00

	Tin Plate (14 x 20 in.)
IC—20-lb. coating.....	\$10.00 to \$11.00
IC—30-lb. coating.....	12.00 to 13.00
IC—40-lb. coating.....	13.75 to 14.25

	Sheets, Box Annealed—Black, C. R.
	One Pass
	Per Lb.
Nos. 18 to 20.....	3.80c.
No. 22.....	3.95c.
No. 24.....	4.00c.
No. 26.....	4.10c.
No. 28*.....	4.25c.
No. 30.....	4.50c.

	Sheets, Galvanized
	Per Lb.
No. 14.....	4.40c.
No. 16.....	4.25c.
No. 18.....	4.40c.
No. 20.....	4.50c.
No. 22.....	4.60c.
No. 24.....	4.75c.
No. 26.....	5.00c.
No. 28*.....	5.25c.
No. 30.....	5.65c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

\$16 per ton, delivered. Brokers are offering \$15.50 per ton, delivered eastern Pennsylvania, or about \$12 per ton, New York. Steel mill stove plate is being bought by brokers at \$11.75 to \$12 per ton, delivered to Phoenixville and Harrisburg, Pa. Specification pipe is inactive, and most brokers are offering only \$15 per ton, delivered to Lebanon, Pa. Foundry grade stove plate at \$8.50 to \$9 per ton, New York, is nominal, as local consumers are not accepting shipments at present.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	\$12.00 to \$13.00
Heavy melting steel (yard)	8.25 to 9.25
No. 1 hvy. breakable cast	11.25 to 12.00
Stove plate (steel works)	7.75 to 8.25
Locomotive grate bars	8.25 to 8.75
Machine shop turnings	7.25 to 7.50
Short shoveling turnings	7.25 to 7.50
Cast borings (blast furn. or steel works)	7.00 to 7.25
Mixed borings and turnings	6.75 to 7.00
Steel car axles	19.25 to 19.75
Iron car axles	24.00 to 25.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	11.25 to 11.75
Forge fire	9.50 to 10.00
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought, long	11.00 to 11.50
Rails for rolling	13.00 to 13.50
Cast iron car wheels	12.00 to 12.25
Stove plate (foundry)	8.50 to 9.00
Malleable cast (railroad)	14.00 to 14.50
Cast borings (chemical)	10.00 to 10.50

Prices per gross ton, delivered local foundries:

No. 1 machry. cast	\$17.00
No. 1 hvy. cast (columns, bldg. materials, etc.), cupola size	15.00
No. 2 cast (radiators, cast boilers, etc.)	14.50

Railroad Equipment Orders Have Declined

THE railroad equipment market has been devoid of important activity in the past week, but a report from Chicago says that a Western road may soon inquire for 5000 cars. The Mexican Central has ordered 240 box cars and may buy 800 more. Details of the week's business follow:

Mexican Central Railway has ordered 240 box cars from Standard Steel Car Co. and will buy 800 additional cars of same type.

Georgia Railroad has ordered eight baggage and mail cars from American Car & Foundry Co.

Manila Railroad is inquiring for 100 flat cars and 100 box cars.

Delaware & Hudson is asking for bids on the repair of 150 composite hopper cars.

Wichita Falls & Southern has ordered 15 ballast cars from American Car & Foundry Co.

Anglo-Mexican Petroleum Co. is inquiring for 10 tank cars.

Pittsburgh Steel Co. is in the market for 10 gondola cars.

Erie has ordered 25 caboose cars from Magor Car Corporation.

Virginia-Carolina Chemical Corporation has ordered five tank cars from General American Tank Car Corporation.

Royal State Railways of Slam have ordered six locomotives from Baldwin Locomotive Works.

Cleveland

Automobile Companies Are Specifying Less Freely But Mills Are Shipping Heavily—Orders Still Plentiful

CLEVELAND, May 28.—Buyers are not yet showing much interest in third quarter prices on steel bars, plates and structural material. There is little talk of an advance on these products, and it is felt that higher prices would meet with sharp resistance from consumers. Present prices on hot and cold-rolled strip steel and on bolts and nuts have been reestablished for the coming quarter. So far, the only price change announced for that delivery is the advance on blue annealed sheets under the new classification. The demand for steel bars, plates and structural shapes is holding up to the recent good volume and tonnage entered this month by local sales offices will show no falling off as compared with April. Mill deliveries show no improvement, and material shipped evidently is going immediately into production.

Heavy specifications for rim sections are coming from tire and other rim manufacturers and deliveries on these sections have been extended into July. Specifications from the automotive industry for full finished sheets, cold-rolled strip and alloy steel bars show some decrease, and deliveries on these products have improved. The motor car builders have specified for steel for their June requirements, but as yet have not ordered much material for July. Some of the companies which are about to bring out new models are cutting their production schedules sharply, but leading makers of low-priced cars evidently are not planning curtailment in the near future. However, with the high automobile production during the first five months of the year, quite a slowing down in the output is expected during June.

Activity in the structural field continues light, and the competition for fabricated steel orders is bringing out low prices. The market is firm at 1.95c. to 2c., Cleveland, for steel bars and at 1.95c., Pittsburgh, for plates and structural material.

Coke.—Ohio by-product coke has been reestablished at \$8.25, Painesville, for June shipment. Some contracts for Connellsville foundry coke for the third quarter are being closed at the prices that have prevailed during the present quarter.

Pig Iron.—While some producers looked for a third-quarter buying movement in the latter part of May, orders for that delivery so far have been light. Sales declined the past week, Cleveland interests taking 11,500 tons, as compared with 15,000 tons the previous week. Much of this business was for early shipment. It is evidently the attitude of consumers that prices will go no higher and by delaying purchasing a few weeks they will know more accurately what their requirements will be for the third quarter than they can determine at the present time. Shipments continue heavy and the total for May is expected to be fully as large as during April. A slight falling off in automobile production has not seemed to have caused any lessening in the demand for pig iron for the automotive industry. Little interest is being taken in prices, as the market is well established at quotations that have

been prevailing for some time. Cleveland furnaces quote foundry and malleable iron at \$18.50 furnace for outside shipment and \$19 for local delivery. Other Lake furnaces quote a minimum of \$19. In Michigan there is a spread of \$20 to \$20.50.

Prices per gross ton at Cleveland:

N'th'n fdy., sil.	1.75 to 2.25	\$19.50
S'th'n fdy., 1.75 to 2.25	.....	\$21.00 to 21.50
Malleable	.....	19.50
Ohio silvery, 8 per cent.	.....	29.00
Basic Valley furnace	.....	18.50
Stand. low phos., Valley	26.50 to	27.00

Prices except on basic and low phosphorus are delivered Cleveland. Freight rates: 50c. from local furnaces; \$3 from Jackson, Ohio; \$6 from Birmingham.

Sheets.—The falling off in specifications for auto body sheets, previously noted, is still in evidence and this is relieving the delivery situation. There is little improvement as yet in deliveries of other grades, as most mills have enough orders on their books to keep them operating at maximum capacity for six to eight weeks. Practically all mills have reaffirmed present prices for the third quarter on black, galvanized and auto body sheets and have adopted the revised classification on blue annealed sheets, but the opening of books for that delivery has resulted in very little contracting. This quarter's prices on electrical sheets have been reestablished for the coming quarter.

Wire Products.—While wire is in good demand, there is apparently not enough business to keep all the mills fully employed and weakness has developed, concessions of \$2 a ton to 2.40c. being reported on black basic wire. Irregularity on nails in some

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	3.00c.
Soft steel bars	3.00c.
Reinforc. steel bars	2.25c. to 2.50c.
Cold-fin. rounds and hex.	3.65c.
Cold-fin. flats and sq.	4.15c.
Hoops and bands, No. 12 to 14 in. inclusive	3.25c.
Hoops and bands, No. 13 and lighter	3.65c.
Cold-finished strip	5.95c.
Black sheets (No. 24)	3.70c. to 3.90c.
Galvanized sheets (No. 24)	4.60c. to 4.75c.
Blue ann'd sheets (No. 10)	3.25c.
No. 9 ann'd wire, per 100 lb.	\$2.95
No. 9 gal. wire, per 100 lb.	3.40
Com. wire nails, base per keg	2.95

*Net base, including boxing and cutting to length.

sections continues. Fence and barbed wire are moving well.

Cold-Finished Steel Bars.—Orders show a fair gain this month over April, this evidently being due to the using up of material shipped against lower-priced contracts. The automotive industry is ordering freely and good specifications are being received from other consumers, particularly the machine tool builders. It is expected that present prices will be reaffirmed for the third quarter.

Warehouse Business.—Steel bars, plates and structural material are moving better than in April. Orders for other products are holding up to recent volume, except for sheets, all grades of which show a decline in the demand.

Semi-Finished Steel.—Specifications against contracts booked at the old prices show no decline and a local mill has caught up only slightly on deliveries, being still fully committed for 25 days. Some inquiry for material for prompt shipment is still coming out, but mills are unable to take additional orders. While it is expected that present prices will prevail during the third quarter, no inquiry has come out for that delivery.

Old Material.—There is an absence of consumer demand that has resulted in a further weakening in prices. Two local mills are getting considerable steel making scrap by water from Detroit, and one is still sharply restricting shipments by local dealers. Blast furnace scrap and machine shop turnings have declined 25c. a ton. While dealers have not reduced their asking prices for steel making grades for Cleveland delivery, small lots are moving at concessions. The market is also weaker in the Youngstown district, where dealers are paying \$17.25 to \$17.50 for No. 1 heavy melting steel and \$16.75 to \$17 for compressed sheet steel.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades	
No. 1 heavy melting steel.	\$15.25 to \$15.75
No. 2 heavy melting steel.	15.00 to 15.50
Compressed sheet steel....	15.00 to 15.50
Light bundled sheet stampings	12.00 to 12.50
Drop forge flashings.....	13.00 to 13.25
Machine shop turnings....	9.25 to 9.50
No. 1 railroad wrought....	13.50 to 14.00
No. 2 railroad wrought....	16.00 to 16.50
No. 1 busheling.....	13.00 to 13.50
Pipes and flues.....	9.00 to 9.50
Steel axle turnings.....	12.50 to 13.00
Acid Open-Hearth Grades	
Low phos., forging crops..	17.75 to 18.00
Low phos., billet, bloom and slab crops	18.50 to 18.75
Low phos. sheet bar crops.	18.00 to 18.50
Low phos. plate scrap....	18.00 to 18.50
Blast Furnace Grades	
Cast iron borings.....	11.00 to 11.50
Mixed borings and short turnings	11.00 to 11.50
No. 2 busheling.....	11.00 to 11.50
Cupola Grades	
No. 1 cast.....	17.25 to 17.50
Railroad grate bars.....	11.00 to 12.00
Stove plate	12.00 to 12.50
Rails under 3 ft.....	16.75 to 17.25
Miscellaneous	
Railroad malleable	18.00 to 18.50
Rails for rolling.....	16.25 to 16.50

Strip Steel.—Present prices on hot and cold rolled strip steel have been

reaffirmed for the third quarter by some of the mills and it is expected that their adoption will become general. There had been little talk of an advance, although non-integrated hot strip mills will have to pay more for their semi-finished steel during the coming quarter if the recent advance remains in effect. Specifications for hot rolled strip increased with some of the mills during the week and deliveries are no easier. Cold rolled strip orders have declined a little, putting some of the mills in better position on deliveries, although others have as much tonnage on their books as at any time in recent weeks. Most makers are fully committed for three to five weeks. Reaffirmed prices are 1.90c., Pittsburgh, for hot rolled strip wider than 6 in., 2c. for 6 in. and narrower; 2.75c., Cleveland and Pittsburgh, for cold rolled strip to round tonnage buy-

ers; 2.85c. for small lots and 2.35c. for fender stock.

Bolts, Nuts and Rivets.—The present discount of 70 per cent on bolts and nuts has been reaffirmed for the third quarter by several manufacturers. This discount has been in effect for two years. The present prices on stove bolts have also been reaffirmed for the coming quarter. It is expected that the present price of \$3.10 per 100 lb. will be reestablished for large rivets. This price now seems to be well maintained and about all tonnage placed at the former \$2.90 price has been taken out. Demand for bolts and nuts is holding up well, although May orders will show a slight loss as compared with April. Specifications from some of the larger automobile companies are holding up to recent volume, but orders from some of the smaller companies have declined.

Philadelphia

Steel Specifications Heavier—Southern Iron May Compete in District—Heavy Melting Steel Declines

PHILADELPHIA, May 28.—Specifications against current steel contracts have increased in volume during the past week, following a slight lull earlier in the month. Mills are maintaining full operating schedules. The delivery promises on plates, sheets and bars are usually from four to five weeks. On certain plate specifications, some Pittsburgh mills are quoting up to eight weeks' delivery. An eastern Pennsylvania plate mill has recently put on its ninth open-hearth furnace of a total of 12, and the leading Eastern independent is maintaining a high rate of operation at its Coatesville mill. Shape mills are not so fully engaged as other producers, and deliveries usually range from one to three weeks, although more extended deliveries are often the rule on miscellaneous specifications. Railroads are still active buyers of small tonnages of plates, bars and sheets. The Baltimore & Ohio has issued an inquiry for its third quarter requirements of bolts and nuts.

Reinforcing Bars.—No substantial reinforcing bar projects have appeared in Philadelphia since the new State building code became effective. Meanwhile, billet steel reinforcing bar prices continue slightly irregular at 1.95c. per lb., Pittsburgh, and occasionally less, to 2.05c., Pittsburgh. Delivered prices Philadelphia are: 2.27c. to 2.37c. per lb., with a \$5 extra for cutting to length. Rail steel bar prices are about 1.95c., f.o.b. Franklin, Pa., or Tonawanda, N. Y., or 2.27c., delivered Philadelphia, cut to required length.

Pig Iron.—Eastern Pennsylvania furnaces are maintaining the current schedule of prices on foundry iron. An increase in competition from Birmingham furnaces would not be unexpected. New freight rates, effective June 15, will permit shipment of Southern foundry iron on a \$3.50 per ton rail rate to Norfolk, Va., 39c. per ton handling charge at Norfolk and a barge rate to Philadelphia of about \$1.25 a ton. At \$15 a ton, base Birmingham, foundry iron could be delivered alongside dock, Philadelphia, for \$20.14 per ton. The Baldwin Locomotive Works is in the market for 1500 tons of cylinder iron, and it is noteworthy that the last purchase by this company, 1500 tons of floor iron, went to an Alabama

furnace. A small tonnage of basic iron is reported to have been bought by an eastern Pennsylvania consumer, but substantial purchasing of basic is not expected for another fortnight.

Bars.—Deliveries range from four to six weeks and specifications by the automobile industry are heavy. One large producer is still executing a contract with the Ford Motor Co. for about 25,000 tons of bars a month. The price is firm at 1.95c., Pittsburgh, or 2.27c. per lb., delivered Philadelphia.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	\$21.76 to \$22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
East. Pa. No. 1X.....	22.76 to 23.26
Basic (del'd east. Pa.)....	20.25 to 21.00
Gray forge	20.50 to 21.00
Malleable	21.25 to 21.75
Stand. low phos. (f.o.b. N. Y. State furnace)...	22.00 to 23.00
Cop. b'r'g low phos. (f.o.b. furnace)	23.50 to 24.00
Va. No. 2 plain, 1.75 to 2.25 sil.	24.79
Va. No. 2X, 2.25 to 2.75 sil.	25.29

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to \$1.64 from eastern Pennsylvania furnaces; \$4.54 from Virginia furnaces.

Shapes.—Occasional transactions are reported at 2.05c. per lb., f.o.b. nearest mill to consumer, but the usual range of prices is 1.95c. to 2c., f.o.b. mill, or, on a basis of Pencoyd, Pa., 2.01c. to 2.06c., delivered Phila-

delphia. Deliveries are fairly prompt, averaging one to three weeks, but on miscellaneous orders deliveries from some mills extend to five weeks. Fabricators are well engaged, but fabricated steel prices show no tendency to advance. Electrification work on the Reading and Pennsylvania railroads is bringing some substantial tonnages of fabricated steel into the market.

Plates.—Pittsburgh mills are apparently more heavily booked than eastern Pennsylvania producers and on some sizes are quoting up to eight weeks' delivery. Eastern Pennsylvania mills are operating full and are asking four to five weeks delay on most orders. Specifications are heavier than early in the month. Mills have almost 60,000 tons of plates in prospect for ships awarded to the New York Shipbuilding Co., Camden, N. J., but not yet approved by the Shipping Board. Prices are firm at 2.05c., Coatesville, or 2.15c., Philadelphia.

Sheets.—Buying of heavy sheets by builders of commercial automobile bodies has slackened somewhat in the past fortnight, but passenger car builders, especially fabricators executing contracts for the Ford Motor Co., are maintaining a good rate of operation. Prices are firm at 2.10c. to 2.20c., Pittsburgh, or 2.42c. to 2.52c., Philadelphia, for blue annealed, 2.95c., Pittsburgh, or 3.27c., Philadelphia, for black and 3.70c., Pittsburgh, or 4.02c., Philadelphia, for galvanized. A continuous sheet mill is quoting 2c. to 2.15c., Pittsburgh, for third quarter contracts. Radio manufacturers are increasing their output and have closed on some substantial orders for deep drawing and electrical sheets.

Imports.—In the week ended May 25, 252 tons of pig iron arrived at this port from the Netherlands. Steel imports consisted of 296 tons of structural shapes from Belgium, five tons of steel bars from the Netherlands and 53 tons of steel scrap, of which 40 tons was from the United Kingdom and 13 tons from Germany.

Old Material.—No. 1 heavy melting

steel is quotable at \$16 per ton, eastern Pennsylvania, on the basis of a recent purchase of upward of 5000 tons by an eastern Pennsylvania consumer. The available supply of scrap is apparently large and brokers are encountering no difficulty in obtaining adequate tonnages for shipment on contracts. Stove plate is especially plentiful, and the latest purchases by consumers have been at \$12 per ton, delivered. Machine shop turnings are quiet following sales at \$11.50 per ton, and sellers are offering to accept \$11 per ton, delivered. No. 2 heavy melting steel has been bought by an eastern Pennsylvania user at \$12.50 per ton, a 50c. a ton decline from the price previously paid by this consumer.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel.	\$16.00
Scrap T rails.	15.50
No. 2 heavy melting steel.	12.50 to 13.50
No. 1 railroad wrought.	16.00 to 16.50
Bundled sheets (for steel works)	11.50
Hydraulic compressed, new	14.00 to 15.00
Hydraulic compressed, old.	11.50 to 12.00
Machine shop turnings (for steel works)	11.50
Heavy axle turnings (or equiv.)	14.00 to 14.50
Cast borings (for steel works and roll. mill)	11.00 to 11.50
Heavy breakable cast (for steel works)	15.50
Railroad grate bars.	12.00 to 12.50
Stove plate (for steel works)	12.00 to 12.50
No. 1 low phos., hvy., 0.04% and under.	22.00 to 23.00
Couplers and knuckles.	20.00 to 21.00
Rolled steel wheels.	20.00 to 21.00
No. 1 blast f'nce scrap.	10.50 to 11.00
Wrot. iron and soft steel pipes and tubes (new specific.)	15.50
Shafting	19.00 to 19.50
Steel axles	23.00 to 23.50
No. 1 forge fire.	14.00
Cast iron carwheels.	16.00 to 16.50
No. 1 cast.	16.50 to 17.00
Cast borings (for chem. plant)	15.00
Steel rails for rolling.	16.50 to 17.00

Sheet & Tube May Weld Pipe by Electric Method

Directors of the Youngstown Sheet & Tube Co. on Tuesday made additional appropriations for improvements to the company's properties at Campbell, Indiana Harbor and South Chicago, in line with improvement program announced earlier in the year.

President James A. Campbell states the company booked considerably more lapweld pipe tonnage in May than in April, and now has more of such business on its books than any time this year. He believes the course of the steel business will run on an even keel during the midsummer months and says that new business from the railroads, equipment companies and from agricultural implement builders will help balance steel makers' books.

Mr. Campbell indicated that the company contemplates installation of capacity to manufacture large diameter steel tubing by the electric welding method. This will afford another outlet for the production of its large plate mill at Mosier, which was built during the war by the old Brier Hill Steel Co. The Sheet & Tube company's seamless tube mills have been

operating at a high rate most of this year.

Directors declared for the second quarter the usual quarterly dividends of \$1.25 per share on common and \$1.37½ on preferred, both payable July 1 to holders of record June 15.

Pittsburgh Iron and Steel Market

(Concluded from page 1516)

scrap market seems to have gained a somewhat firmer undertone. No. 1 heavy melting steel is now quotable at \$17.50 to \$18. One sale at \$18.50 is reported, but in this case the consumer required a particularly high grade of scrap, preferably railroad steel, and was willing to pay a 50c. premium to get it. No large sales of compressed sheets have been made recently, but small transactions have certainly not brought more than \$18, with lower quotations ruling on the greater part of the business. Mills in the district are using scrap at an undiminished rate, but shipments are going forward steadily, and at some points inspection is more rigid than usual. Shipments of the blast furnace grades are also well sustained, and, on the basis of sales during the last week, are now quotable 50c. higher, or at \$12 to \$12.50. The monthly list of the Baltimore & Ohio Railroad, on which bids will go on June 3, contains about 15,000 tons of steel, most of which is heavy melting.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:

No. 1 heavy melting steel.	\$17.50 to \$18.00
No. 2 heavy melting steel.	15.50 to 16.00
Scrap rails	17.00 to 17.50
Compressed sheet steel.	17.50 to 18.00
Bundled sheets, sides and ends	16.00 to 16.50
Cast iron carwheels.	16.00 to 16.50
Sheet bar crops, ordinary.	18.50 to 19.00
Heavy breakable cast.	13.00 to 13.75
No. 2 railroad wrought.	17.75 to 18.25
Hvy. steel axle turnings.	15.75 to 16.75
Machine shop turnings.	10.75 to 11.25

Acid Open-Hearth Grades:

Railr. knuckles and couplers	20.25 to 20.75
Railr. coll and leaf springs	20.25 to 20.75
Rolled steel wheels.	20.25 to 20.75
Low phos. billet and bloom ends	22.00 to 22.50
Low phos., mill plates.	22.00 to 22.50
Low phos., light grades.	20.00 to 20.50
Low phos., sheet bar crops	20.00 to 21.00
Heavy steel axle turnings.	15.75 to 16.75

Electric Furnace Grades:

Low phos. punchings.	19.50 to 20.50
Hvy. steel axle turnings.	15.75 to 16.75

Blast Furnace Grades:

Short shoveling steel turnings	12.00 to 12.50
Short mixed borings and turnings	12.00 to 12.50
Cast iron borings.	12.00 to 12.50

Rolling Mill Grades:

Steel car axles.	21.50 to 22.00
------------------	----------------

Cupola Grades:

No. 1 cast.	15.00 to 16.00
Rails 3 ft. and under.	19.50 to 20.50

A regular meeting of the Electric Hoist Manufacturers Association was held in New York on May 18. Each member-company had representatives in attendance. The next meeting of the association is scheduled to be held at Niagara Falls, N. Y., on June 28.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier.	2.70c.
Plates, ½-in.	2.90c.
Structural shapes	2.70c.
Soft steel bars, small shapes, iron bars (except bands)	2.80c.
Round-edge iron	3.50c.
Round-edge steel, iron finished 1½ x 1½ in.	3.50c.
Round-edge steel, planished.	4.30c.
Reinforc. steel bars, sq. twisted and deform.	2.60c. to 2.80c.
Cold-fin. steel, rounds and hex.	3.60c.
Cold-fin. steel, sq. and flats.	4.10c.
Steel hoops	3.40c.
Steel bands, No. 12 to ¾-in., inclus.	3.15c.
Spring steel	5.00c.
*Black sheets (No. 24)	4.10c.
†Galvanized sheets (No. 24)	4.85c.
Blue ann'l'd sheets (No. 10)	3.25c.
Diam. pat. floor plates—	
¼-in.	5.30c.
½-in.	5.50c.
Rails	3.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 4.10c. base; 1 to 9 bun., 4.35c. base.
†For 50 bundles or more; 10 to 49 bun., 4.95c. base; 1 to 9 bun., 5.30c. base.

Pacific Coast

Demand for Steel Products Fairly Active—5000 Tons Wanted for Two Los Angeles Buildings

SAN FRANCISCO, May 25 (*By Air Mail*).—While awards of most forms of steel products were not heavy this week, a number of new projects calling for good-sized tonnages have come out for figures. Demand is holding up well. Plate and shape bookings so far this year exceed the total placed during the entire first half of 1928. Prices are fairly firm. Bids have been called for on 5000 tons of fabricated steel for two office buildings in Los Angeles.

Pig Iron.—Little of importance has come into the market during the week. Buying is confined to immediate needs. Prices are unchanged.

Prices per gross ton at San Francisco:

*Utah basic	.....	\$25.00 to \$26.00
*Utah fdy., sil.	2.75 to 3.25	25.00 to 26.00
**Indian fdy., sil.	2.75 to 3.25	25.00 to 26.00

*Delivered San Francisco.

**Duty paid, f.o.b. cars San Francisco.

Bars.—Awards of reinforcing steel bars exceeded 1500 tons and included 600 tons for the San Francisco Stock Exchange Building, placed with Soule Steel Co., and 455 tons for a warehouse in Oakland, booked by Gunn, Carle & Co. Pasadena will shortly come into the market for 750 tons for a dam across the San Gabriel River. Bids will be opened June 3 on 2000 tons for the City-County Building addition at Seattle. Out-of-stock prices in the Los Angeles district have been advanced \$2 a ton, and 2.30c., base, now applies on lots of 250 tons and up, with 2.40c., applying on carload lots, and 2.70c., base, on smaller tonnages. In the San Francisco section, 2.20c., base, applies on 250-ton lots, 2.30c. on carload business and 2.60c., base, on small tonnages. Merchant bar prices are firm at 2.35c., c.i.f.

Plates.—The Western Pipe & Steel Co. has been awarded 575 tons of 5/16-in. plate for a 24-in. welded steel pipe line for Los Angeles. Pending business includes 195 tons for a 24-in. electrically welded steel pipe line for Los Angeles, bids on which have been opened, 500 tons for a penstock for the Mount Diablo power tunnel project, Seattle, and 230 tons for a 20 or 24-in. riveted steel pipe line at Walla Walla, alternate bids to be received on cast iron pipe. An election will be held on June 18 at Pasadena, Cal.,

Warehouse Prices, f.o.b. San Francisco

Base per Lb.	
Plates and struc. shapes.....	3.15c.
Soft steel bars.....	3.15c.
Small angles, 1/4-in. and over.....	3.15c.
Small angles, under 1/4-in.....	3.55c.
Small channels and tees, 1/4-in. to 2 1/2-in.....	3.75c.
Spring steel, 1/4-in. and thicker.....	5.00c.
Black sheets (No. 24).....	4.90c.
Blue ann'l'd sheets (No. 10).....	3.80c.
Galv. sheets (No. 24).....	5.30c.
Struct. rivets, 1/2-in. and larger.....	5.65c.
Com. wire nails, base per keg.....	\$3.40
Cement c't'd nails, 100 lb. keg.....	3.40

to vote on bonds for a dam over the San Gabriel River. This project will require 9000 tons for a 60-in. riveted steel pipe line. Prices continue at 2.35c., c.i.f. Coast ports.

Shapes.—While structural shape bookings fell off considerably from the weekly totals of the past two months, a number of new projects have come up for figures. The largest letting, 450 tons for a power house in Honolulu, went to Moore Dry Dock Co. Consolidated Steel Corporation booked 200 tons for an office building addition in Los Angeles. Included among the new inquiries are 3000 tons for an office building on Fifth Street, Los Angeles, 600 tons for an exhibition building at Pomona, Cal., 2000 tons for an office building on South Olive Street, Los Angeles, and 576 tons for a viaduct at Tacoma. Structural material continues firm at 2.35c., c.i.f.

Cast Iron Pipe.—Cast iron pipe bookings involved only one lot in excess of 100 tons. This called for 480

tons of 4 to 16-in. Class B pipe for District No. 2, Southgate, Cal., placed with Lee R. Weber, Santa Monica. Demand apparently is increasing; more than 7000 tons is now up for figures or pending. Included in this tonnage are the following: Long Beach, Cal., 2398 tons 6-in. Class B. Bids May 28. Santa Barbara, Cal., 273 tons, 4 to 12-in. Class B. Bids opened. Oceanside, Cal., 701 tons 6 to 16-in. Class B of centrifugal. Bids opened. San Diego, Cal., 188 tons, 4 to 12-in. Class C. Daley Corporation low. Redwood City, Cal., 193 tons 4 to 8-in. Class B. Union Paving Co. low. Walla Walla, Wash., 963 to 1283 tons 20 or 24-in. Class B or riveted pipe. Bids May 29.

Steel Pipe.—The Northwestern Utilities Co., Edmonton, Wash., will install 20 1/2 miles of 12 1/4-in. o. d. gas pipe between Viking and Holden, taking about 2350 tons of pipe. Los Angeles recently opened bids on 575 tons of 24-in. lapwelded or electrically welded steel pipe and has awarded the business to Western Pipe & Steel Co. on an electrically welded basis. This city has also opened bids on 195 tons of 24-in. lapwelded or electrically welded steel pipe, and the Western Pipe & Steel Co. is low bidder on welded steel pipe.

Boston

Pig Iron Consumers Delay Third Quarter Buying—Cast Iron Pipe Prices Are Weak

BOSTON, May 28.—New England foundries continue to postpone third quarter pig iron buying. It is now evident that quite a few of them overbought for second quarter delivery and have enough iron in stock and on contract to carry them into the third quarter. Sales the past week approximated 3000 tons, about half of which was New York State iron, part for spot delivery and part for third quarter. A small tonnage of charcoal iron was sold. New York State iron is holding at \$18.50 a ton, base furnace, with 50c. differentials; Buffalo iron is generally \$18.50 a ton, base furnace, although \$18 can still be done; and Mystic is meeting these prices and shading them when necessary. Alabama iron is holding at recent prices; western Pennsylvania iron is \$18.50 a ton, base furnace, while eastern Pennsylvania quotations are more or less elastic. Aside from a 2000-ton inquiry for No. 1X, which still remains uncovered after three weeks, there is no prospective business of importance in sight.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil.	1.75 to 2.25	\$22.91 to \$23.41
*Buffalo, sil.	2.25 to 2.75	23.41 to 23.91
East Penn., sil.	1.75 to 2.25	25.15
East Penn., sil.	2.25 to 2.75	25.65
Va., sil.	1.75 to 2.25	25.21
Va., sil.	2.25 to 2.75	25.71
Ala., sil.	1.75 to 2.25	21.91 to 24.27
Ala., sil.	2.25 to 2.75	22.41 to 24.77

Freight rates: \$4.91 all rail from Buffalo; \$3.65 from eastern Pennsylvania; \$5.21 all rail from Virginia; \$6.91 to \$8.77 from Alabama.

*All rail rate.

Cast Iron Pipe.—Chelsea, Mass., has bought 200 tons of 6 to 12-in. French pipe; Revere, Mass., 200 tons of 6 to 12-in. from an unnamed foundry; Swampscott, Mass., 150 tons of 6-in. from an unnamed foundry; East Bridgewater, Mass., 144 tons of 6-in. from R. D. Wood & Co.; and Marblehead, Mass., 100 tons from the Warren Foundry & Pipe Co. Newton, Mass., closed bids May 28 on 300 tons of 6 and 8-in. stock. Prices quoted

Warehouse Prices, f.o.b. Boston

Base per Lb.	
Plates.....	3.365c.
Structural shapes—	
Angles and beams.....	3.365c.
Tees.....	3.365c.
Zees.....	3.465c.
Soft steel bars, small shapes.....	3.265c.
Flats, hot-rolled.....	4.15c.
Reinforcing bars.....	3.265c. to 3.54c.
Iron bars—	
Refined.....	3.265c.
Best refined.....	4.60c.
Norway rounds.....	6.60c.
Norway squares and flats.....	7.10c.
Spring steel—	
Open-hearth.....	5.00c. to 10.00c.
Crucible.....	12.00c.
Tie steel.....	4.50c. to 4.75c.
Bands.....	4.015c. to 5.00c.
Hoop steel.....	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex.....	*3.55c. to 5.55c.
Spares and flats.....	*4.05c. to 7.05c.
Toe calk steel.....	6.00c.
Rivets, structural or boiler.....	4.50c.
Per Cent Off List	
Machine bolts.....	50 and 5
Carriage bolts.....	50 and 5
Lag screws.....	50 and 5
Hot-pressed nuts.....	50 and 5
Cold-punched nuts.....	50 and 5
Stove bolts.....	70 and 10

*Including quantity differentials.

openly on small domestic pipe are 50c. to \$1 a ton lower than on May 1 and \$2 off on large dimensions, and they are still subject to concessions when tonnages are attractive. Prices are: 4-in., \$47.10 a ton, delivered common Boston freight rate points; 6 to 12-in., \$42 to \$43.10; 16 to 20-in., \$40 to \$42.10. A \$3 differential is asked on Class A and gas pipe.

Reinforcing Bars.—An inquiry for 225 tons of billet steel reinforcing bars for a children's hospital and two or three other sizable tonnages have livened up the market somewhat, but most of the current business is confined to small tonnages from stock. Sales the past week in Greater Boston did not exceed 300 tons. Bars are 2.66½c. per lb., base, from stock. No improvement in the demand for rail steel bars is noted. They are 2.26½c. per lb., base, delivered common Boston freight rate points.

Shapes and Plates.—Fabricating jobs are growing more plentiful, but a large majority of them involve small tonnages. Fabricators continue to make low prices on large tonnages, but secure a good profit on small jobs. Some have sufficient business on their books for three months' operation. Most of them are carrying smaller stocks than in years.

Coke.—Virtually all New England foundries have signed contracts for last half by-product coke requirements. By-product foundry coke remains at \$11 a ton, delivered within a \$3.10 freight rate zone.

Old Material.—A steamer with 700 tons of scrap loaded at St. John, N. B., is taking on 2300 tons additional here for Danzig, and will not finish until next week owing to a scarcity of material at offered prices. Another steamer will load 3500 tons here in June for Danzig. A boat is now taking on 1000 tons of relaying rails for Los Angeles. Fewer price changes of importance on material suitable for Pennsylvania consumption were made the past week than in recent similar periods. For steel mill borings, \$6.25 a ton, on cars shipping point, seems to be the prevailing price; for forge flashings, \$10; for mixed borings and turnings, \$6.25, and for forge scrap, \$9.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel.....	\$11.50 to \$11.75
Scrap T rails.....	11.00 to 11.25
Scrap girder rails.....	10.00 to 10.50
No. 1 railroad wrought.....	12.00 to 12.50
No. 1 yard wrought.....	9.50 to 10.00
Machine shop turnings.....	6.50 to 6.60
Cast iron borings (steel works and rolling mill).....	6.25 to 6.50
Bundled skeleton, long.....	8.50 to 10.00
Forged flashings.....	10.00 to 10.50
Blast furnace borings and turnings.....	6.00 to 6.25
Forge scrap.....	8.75 to 9.00
Shafting.....	14.00 to 14.25
Steel car axles.....	16.50 to 17.00
Wrought pipe 1 in. in diameter (over 2 ft. long).....	10.50 to 10.75
Rails for rolling.....	12.00 to 12.50
Cast iron borings, chemical.....	10.00 to 10.25
<i>Prices per gross ton deliv'd consumers' yards:</i>	
Textile cast.....	\$14.50 to \$14.75
No. 1 machinery cast.....	16.00 to 16.50
No. 2 machinery cast.....	14.00 to 14.50
Stove plate.....	11.50 to 12.00
Railroad malleable.....	19.00 to 19.50

Birmingham

Steel Demand Continues in Heavy Volume, Cast Iron Pipe Improving, But Pig Iron Is Dull

BIRMINGHAM, May 28.—Pig iron sales vary little from the average of the past several weeks. Melters are carrying light stocks and demanding quick deliveries. The total movement of iron continues unsatisfactory. Interest in third quarter iron has not developed except in a small way. The No. 2 Woodward furnace of the Woodward Iron Co. was changed from basic foundry iron on May 21. Ten furnaces are now on foundry iron, six on basic and one on recarburizing, a total of 17.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil. ..	\$15.00 to \$15.50
No. 1 fdy., 2.25 to 2.75 sil. ..	15.50 to 16.00
Basic	15.00 to 15.50

Finished Steel.—The heavy volume of finished steel business continues without abatement. Each week this month has shown a gain over the preceding week. Operations have been increased during the month from approximately 85 per cent to 87 to 90 per cent. One of the larger companies reports enough business on the books to support operations through the larger part of July. It is significant that nearly all of the business is coming from regular customers. Exports have shown only a slight increase. Prices are steady

and unchanged. Fabricated structural steel lettings include 800 tons for the Mitchell Street viaduct in Atlanta; 325 tons for the Fairforrest Finishing Co., Spartanburg, S. C., and 250 tons for airplane hangars at Dawson, Okla., all booked by the Virginia Bridge & Iron Co. Reinforcing bar demand is strong, with prospective business heavy. Open-hearth operations are the same, 20 being active.

Cast Iron Pipe.—Pressure pipe plants increased backlogs during the past week by bookings from distant points. The No. 2 North Birmingham plant of the United States Pipe & Foundry Co. will be placed in operation again after several years' idleness. The Birmingham shops of the United States company will make a considerable portion of the 40,000 tons of pipe recently ordered by Albany, N. Y. New orders of the American Cast Iron Pipe Co. include 560 tons for Huntington, N. Y.; 920 tons for Santa Fe Springs, Cal.; 657 tons for Southgate, Cal.; 380 tons for Williamsville, Mo.; 230 tons for Los Angeles; 300 tons for Minneapolis; 216 tons for San Antonio, Tex., and 150 tons for Detroit. New Orleans will open bids June 26 for 6650 tons

of 36 to 48-in. pipe. Other projects up for figures include 700 tons for Hollywood, Fla., to be let June 11; 13,000 ft. of 8-in. and 16,000 ft. of 6-in. for Tehula, Miss., and five miles of pipe for Russell, Ky., for which bids were opened May 27. Prices remain at \$37 to \$38 for six-inch and larger sizes.

Old Material.—Heavy melting steel and steel rails are finding a little demand. Other lines are slow. Prices are soft but unchanged.

Prices per gross ton, deliv'd Birmingham dist. consumers' yards:

Heavy melting steel.....	\$12.50
Scrap steel rails.....	13.00
Short shoveling turnings.....	9.00
Cast iron borings.....	9.00
Stove plate.....	13.00
Steel axles.....	21.00
Iron axles.....	23.00
No. 1 railroad wrought.....	\$10.00 to 10.50
Rails for rolling.....	14.00 to 15.00
No. 1 cast.....	14.00
Tramcar wheels.....	13.00 to 14.00
Cast iron carwheels.....	13.00 to 13.50
Cast iron borings, chem.....	13.50 to 14.00

Canada

Structural Steel Leads in Market Activity

TORONTO, ONT., May 28.—Pig iron demand is confined to moderate-sized lots for spot delivery. Inquiry for third quarter iron is appearing. Producers will open their books early in June. The opening of navigation has stimulated shipments of iron. Prices are holding, with most of the sales at the low level of the spread.

Prices per gross ton:

<i>Delivered Toronto</i>	
No. 1 fdy., sil. 2.25 to 2.75.....	\$24.10 to \$24.60
No. 2 fdy., sil. 1.75 to 2.25.....	24.10 to 24.60
Malleable.....	24.10 to 24.60
<i>Delivered Montreal</i>	
No. 1 fdy., sil. 2.25 to 2.75.....	\$25.50 to \$26.00
No. 2 fdy., sil. 1.75 to 2.25.....	25.50 to 26.00
Malleable.....	25.50 to 26.00
Basic.....	24.50 to 25.00
<i>Imported Iron, Montreal Warehouse</i>	
Summerlee.....	\$33.50
Carron.....	33.00

Structural Steel.—Building permits issued and programs of large construction projects announced have had a stimulating effect on the demand for structural steel. The Dominion Bridge Co. will supply 5000 tons of steel for the new Canadian National Railway hotel at Vancouver, B. C. The Hamilton Bridge Co. has received orders for 500 tons for addition to the factory of Procter & Gamble Co. at Hamilton, and for 700 tons for an addition to the plant of the Stanley Steel Works at Hamilton. Prospective business includes 1500 tons for addition to building at Temperance and Sheppard streets, Toronto, for the Bell Telephone Co. of Canada and 3000 tons for a hotel on Place d'Ames, Montreal, Que. Pending orders in Toronto total 15,000 tons, while the total for Montreal is estimated at upward of 25,000 tons.

Old Material.—The demand for iron and steel scrap has slackened during the past week or 10 days. Sales of heavy melting steel and turnings

have slumped in the Toronto and Hamilton districts. Prices are unchanged.

Dealers' buying prices:

	Per Gross Ton	Toronto	Montreal
Heavy melting steel.	\$10.00	\$8.50	
Rails, scrap	11.00	9.00	
No. 1 wrought.	10.00	12.00	
Machine shop turn- ings	7.50	5.00	
Boiler plate	7.50	6.00	
Heavy axle turnings	8.00	7.50	
Cast borings	7.50	5.00	
Steel turnings	7.50	6.50	
Wrought pipe	6.00	6.00	
Steel axles	15.00	20.00	
Axles, wrought iron.	17.00	22.00	
No. 1 machinery cast		17.00	
Stove plate		13.00	
Standard carwheels.		16.00	
Malleable		13.00	
	Per Net Ton		
No. 1 mach'y cast.	\$16.00		
Stove plate	12.00		
Standard carwheels.	15.00		
Malleable scrap	14.00		

Youngstown

Predicts Active Summer

YOUNGSTOWN, May 28.—President E. T. McCleary of the Republic Iron & Steel Co., predicts an active summer for the steel trade, and believes recession in business will be less pronounced than usual. He indicates that new steel pipe business is being received in larger volume and that such production will help to balance schedules during the summer months. The railroads and equipment companies are also buying in heavier volume.

Iron and steel production in the Mahoning Valley is running 15 per cent higher than for the last week of May, 1928. Of 51 independent open-hearth furnaces, 48 are scheduled, one less than the preceding week, and comparing with 36 active a year ago. Production is averaging 88 per cent this week in the Youngstown district. Of 120 Valley sheet mills, 114 are under power, or 15 more than last year at this time.

Fabricating interests are maintaining their plant operations at close to a capacity basis.

To provide additional funds for its new sheet mill plant, under construction at Monroe, Mich., the Newton Steel Co. has authorized the sale of 24,000 shares of no par value treasury common stock, at \$85 per share. This will realize \$2,040,000, and will give the company a total of 264,000 shares of common stock outstanding. In addition, it has \$2,177,500 of preferred stock issued.

Preliminary plans for a third international conference on coal, under the auspices of the Carnegie Institute of Technology, Pittsburgh, are apparently under way, according to a statement by Dr. Thomas S. Baker, president of the institute and organizer of the first and second conference. The success of these congresses and the development in fuel technology encourage the belief that another conference would be welcome and that it would be of value. No date, however, has yet been fixed.

Buffalo

Pig Iron Shipments Undiminished but Buying Is Light—Steel Mills Still Operating Full

BUFFALO, May 28.—The pig iron buying lull continues, although some business continues to trickle in to producers in small lots. The largest inquiry out just now is one for 1500 tons of foundry from a New York State melter. There is a 1000-ton inquiry from New England and two 500-ton inquiries for the same grade from down state. Melters seem to be pretty well covered for the rest of the second quarter. There has been a little buying for the third quarter at the quoted prices. Shipments are going out very well, indicating that the melt is undiminished. Local producers are obtaining \$18.50 on small lots, with some \$18 business going for New England delivery. The \$19.50 base price in the district stands.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25.	\$18.50 to \$19.50
No. 2X fdy., sil. 2.25 to 2.75.	19.00 to 20.00
No. 1 fdy., sil. 2.75 to 3.25.	20.00 to 21.00
Malleable, sil. up to 3.25.	19.00 to 20.00
Basic	17.50 to 18.50
Lake Superior charcoal	27.28

Finished Iron and Steel.—Buffalo mills are running at practical capacity, with the demand showing little signs of tapering.

Old Material.—The market is easier. Buying is at a minimum. One sale of heavy melting steel was made at \$17.25, and there had been instances of dealers offering \$17.25 on old orders, but most of these are now filled. Some of the dealers are offering no more than \$17. The hydraulic compressed price is off, some moving at \$14.50 to \$14.75. The demand for specialties has slackened, with \$19 to \$20 a fair range for knuckles and couplers, coil and leaf springs and rolled steel wheels. The malleable grades have eased to \$19 to \$20. Some purchases of 2-ft. rails have been made at

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.40c.
Soft steel bars	3.30c.
Reinforcing bars	2.95c.
Cold-fin. flats, sq. and hex.	4.45c.
Rounds	3.95c.
Cold-rolled strip steel	5.85c.
Black sheets (No. 24)	4.20c.
Galv. sheets (No. 24)	4.85c.
Blue ann'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	\$3.60
Black wire, base per 100-lb.	3.75

\$20.50, but for 3-ft. rails \$19.50 to \$20 appears to be the market.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades	
No. 1 heavy melting steel	\$17.00 to \$17.25
No. 2 heavy melting steel	14.75 to 15.00
Scrap rails	17.00 to 18.00
Hydraul. comp. sheets	14.50 to 14.75
Hand bundled sheets	12.00 to 12.50
Drop forge flashings	14.75 to 15.00
No. 1 busheling	15.50 to 16.50
Hvy. steel axle turnings	14.00 to 14.50
Machine shop turnings	7.50 to 7.75
No. 1 railroad wrought	13.50 to 14.00

Acid Open-Hearth	
Knuckles and couplers	19.50 to 20.00
Coil and leaf springs	19.50 to 20.00
Rolled steel wheels	19.50 to 20.00
Low phos. billet and bloom ends	20.00 to 20.50

Electric Furnace Grades	
Short shov. steel turnings	12.00 to 12.50

Blast Furnace Grades	
Short mixed borings and turnings	10.50 to 11.50
Cast iron borings	11.00 to 12.00
No. 2 busheling	10.00 to 10.50

Rolling Mill Grades	
Steel car axles	18.75 to 19.25
Iron axles	21.00 to 22.00

Cupola Grades	
No. 1 machinery cast	16.00 to 17.00
Stove plate	12.50 to 13.00
Locomotive grate bars	12.50 to 13.00
Steel rails, 3 ft. and under	19.50 to 20.00
Cast iron carwheels	14.00 to 14.50

Malleable Grades	
Industrial	19.00 to 20.00
Railroad	19.00 to 20.00
Agricultural	19.00 to 20.00

Special Grades	
Chemical borings	12.50 to 13.50

Cincinnati

Weakness of Southern Iron Deters Buyers from Making Third Quarter Contracts—Sheet Bookings Large

CINCINNATI, May 28.—Weakness in Southern iron has acted as a deterrent to third quarter buying, and consequently sales in the past week have been negligible. Believing that prices may dip somewhat under the present level, melters are content to await developments before placing orders for delivery after June 30. Southern iron is reported to have been quoted in southern Ohio at \$15, Birmingham, with silicon differentials waived, and there are indications that the shading of prices is becoming more prevalent. In an effort to book additional tonnages and thereby cut down large stocks in Southern yards, Alabama

producers are understood to be penetrating farther north in Ohio. Meanwhile, the firm position of Northern iron has not been seriously affected, although competition at certain Ohio River points has necessitated concessions on the part of Northern furnaces. An inquiry for 1500 tons of foundry iron for a local melter is the only important pending transaction.

Prices per gross ton, deliv'd Cincinnati:

So. Ohio fdy., sil. 1.75 to 2.25	\$19.89 to \$20.39
Ala. fdy., sil. 1.75 to 2.25	18.69 to 19.19
Ala. fdy., sil. 2.25 to 2.75	19.19
Tenn. fdy., sil. 1.75 to 2.25	19.19
S't'h'n Ohio silvery, 8 per cent	27.89 to 28.89

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.69 from Birmingham.

Finished Material.—Sales of bars, shapes and plates have been fairly well sustained in the past week. District fabricators, however, are operating at a comparatively low rate, and business from that source has been less than normal. Demand for wire goods in the agricultural sections has been active. Common wire nails are selling at \$2.69 per keg, delivered Cincinnati. Sheet steel bookings have held up to the large volume of recent weeks and production of district mills has continued at full capacity.

Warehouse Business.—Common wire nails are being sold by Louisville jobbers at \$2.60 per keg, f.o.b. warehouses, but quotations at Cincinnati and at other points in this district remain firm at \$2.95. Prices of other commodities are steady and unchanged.

Coke.—By-product foundry coke will remain at \$10.05, delivered Cincinnati, during June. Domestic grades also will be unchanged at \$4.50 and \$3.50, ovens, for egg and walnut sizes respectively, except in the immediate Cincinnati district, where egg size is bringing \$6, delivered Cincinnati, and walnut \$5. Shipments of by-product foundry coke in May declined about 10 per cent from those in April, and a further recession is expected the coming month. Movement of New River foundry coke has slowed up somewhat. Quotations range from \$6 to \$6.50, ovens. Wise County foundry is selling at \$4.75 to \$5, ovens.

Old Material.—A southern Ohio steel company has purchased a round

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes.....	3.40c.
Bars, soft steel or iron.....	3.30c.
New billet reinfrc. bars.....	3.15c.
Rail steel reinfrc. bars.....	3.00c.
Hoops.....	4.05c.
Bands.....	3.50c.
Cold-fin. rounds and hex.....	3.85c.
Squares.....	4.35c.
Black sheets (No. 24).....	4.05c.
Galvanized sheets (No. 24).....	4.90c.
Blue ann'd sheets (No. 10).....	3.45c.
Structural rivets.....	3.85c.
Small rivets.....	.65 per cent off list
No. 9 ann'd wire, per 100 lb.....	\$3.00
Com. wire nails, base per keg.....	2.95
Cement c'd nails, base 100 lb. keg..	2.95
Chain, per 100 lb.....	8.75
Net per 100 Ft.	
Lap-weld steel boiler tubes, 2-in....	\$16.00
4-in.....	33.00
Seamless steel boiler tubes, 2-in....	17.00
4-in.....	34.00

tonnage of heavy melting steel in both No. 1 and No. 2 grades. Otherwise, mill buying has been unimportant. Cast iron scrap users are showing little interest. Prices are fairly steady.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel.....	\$13.00 to \$13.50
Scrap rails for melting.....	13.75 to 14.25
Loose sheet clippings.....	9.50 to 10.00
Bundled sheets.....	10.50 to 11.00
Cast iron borings.....	9.00 to 9.25
Machine shop turnings.....	8.50 to 8.75
No. 1 bushelling.....	10.50 to 11.00
No. 2 bushelling.....	6.75 to 7.00
Rails for rolling.....	14.50 to 15.00
No. 1 locomotive tires.....	14.25 to 14.75
No. 2 railroad wrought.....	13.00 to 13.50
Short rails.....	18.50 to 19.00
Cast iron carwheels.....	12.75 to 13.25
No. 1 machinery cast.....	19.25 to 19.75
No. 1 railroad cast.....	15.25 to 15.75
Burnt cast.....	10.25 to 10.75
Stove plate.....	10.25 to 10.75
Brake shoes.....	10.25 to 10.75
Railroad malleable.....	15.25 to 15.75
Agricultural malleable.....	14.25 to 14.75

St. Louis

Pig Iron Demand at a Minimum—Scrap Weaker—Sheets and Tin Plate Buying Active

ST. LOUIS, May 28.—The pig iron market is extremely dull, sales of the St. Louis Gas & Coke Corporation for the week totaling only about 1000 tons, including 500 tons for a stove manufacturer in northern Illinois and 200 tons for a jobbing foundry in Iowa, all for third quarter. No sales of Southern iron were made. May shipments of the local maker probably will be the heaviest of any month in the history of the company. Melters are hesitant about placing orders for third quarter, and commitments are small. The market is firm, however.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b.	
Granite City, Ill.	\$20.00
Malleable, f.o.b. Granite City.....	20.50
N'th'n No. 2 fdy., deliv'd St. Louis..	22.16
Southern No. 2 fdy., deliv'd.....	\$19.42 to 19.92
Northern malleable, deliv'd.....	22.16
Northern basic, deliv'd.....	22.16

Freight rates: 75c. (average) Granite City to St. Louis; \$2.16 from Chicago; \$4.42 from Birmingham.

Finished Iron and Steel.—The demand for tin plate is steadily increasing, according to the Granite City Steel Co. A marked improvement in buying of galvanized sheets is also noticeable, and the price situation is firmer. Plates and blue annealed

also are in better demand for repair work. The strike in the building trades has not been settled, and operations are at a standstill. The only new business, 900 tons of reinforcing bars for a Terminal Railway Association project, went to the Laclede Steel Co.

Old Material.—With freer offerings of old material, dealers' buying prices have been reduced 25c. on

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes.....	3.25c.
Bars, soft steel or iron.....	3.15c.
Cold-fin. rounds, shafting, screw stock.....	3.75c.
Black sheets (No. 24).....	4.25c.
Galv. sheets (No. 24).....	5.10c.
Blue ann'd sheets (No. 10).....	3.45c.
Black corrug. sheets (No. 24).....	4.30c.
Galv. corrug. sheets.....	5.15c.
Structural rivets.....	3.95c.
Boiler rivets.....	3.95c.
Per Cent Off List	
Tank rivets, 7/8-in. and smaller, 100 lb. or more.....	65
Less than 100 lb.....	60
Machine bolts.....	60
Carriage bolts.....	60
Lag screws.....	60
Hot-pressed, nuts, sq., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more.....	60
Less than 200 lb.....	50

heavy melting and shoveling steel, No. 2 railroad wrought, steel angle bars, railroad malleable and stove plate. Mills seem willing to buy, but offer prices that are not attractive to dealers. Railroad lists, include: Union Pacific, 3046 tons; Missouri-Kansas-Texas, 376 tons; Nickel Plate, 28 carloads; Mobile & Ohio, 15 carloads; Kansas City Southern, 70 tons of short steel rail ends.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

No. 1 heavy melting or shoveling steel.....	\$13.25 to \$13.75
No. 2 heavy melting or shoveling steel.....	12.75 to 13.25
No. 1 locomotive tires.....	15.00 to 15.50
Miscel. stand.-sec. rails including frogs, switches and guards, cut apart....	15.00 to 15.50
Railroad springs.....	17.00 to 17.50
Bundled sheets.....	10.00 to 10.50
No. 2 railroad wrought.....	13.25 to 13.75
No. 1 bushelling.....	10.00 to 10.50
Cast iron borings and shoveling turnings.....	9.50 to 10.00
Iron rails.....	15.00 to 15.50
Rails for rolling.....	15.50 to 16.00
Machine shop turnings.....	8.00 to 8.50
Heavy turnings.....	10.00 to 10.50
Steel car axles.....	18.75 to 19.25
Iron car axles.....	26.50 to 27.00
Wrot. iron bars and trans.....	22.00 to 22.50
No. 1 railroad wrought.....	13.50 to 14.00
Steel rails, less than 3 ft.....	16.50 to 17.00
Steel angle bars.....	14.25 to 14.75
Cast iron carwheels.....	14.25 to 14.75
No. 1 machinery cast.....	15.50 to 16.00
Railroad malleable.....	15.75 to 16.25
No. 1 railroad cast.....	15.00 to 15.50
Stove plate.....	12.75 to 13.25
Agricult. malleable.....	15.00 to 15.50
Relay. rails, 60 lb. and under.....	20.50 to 23.50
Relay. rails, 70 lb. and over.....	26.50 to 29.00

Much Heavier Production of Trackwork in April

April shipments of trackwork for T-rail track of 60 lb. and over are reported by the American Iron and Steel Institute at 16,815 net tons, compared with 14,927 net tons in March. The total is the largest since April, 1927, and, with the further exception of March, 1927, the largest since June, 1926. It compares with 13,511 tons last year. For the four elapsed months the total has been 54,266 tons, against 49,272 tons last year and 62,944 tons in 1927.

Norton Co. Honors 150 Workers

At a dinner given by the Norton Co., Worcester, Mass., at the Hotel Bancroft, Thursday evening, May 23, men and women in the employ of the organization 10 years were presented with bronze buttons, and those who had been in service for 15 years silver buttons, more than 150 receiving the tokens. Speakers at the dinner included Charles L. Allen, president and general manager of the Norton Co., and George N. Jeppson, vice-president and secretary. Clifford S. Andeson, assistant secretary and counsel, was toastmaster.

The scope of the activities at Mellon Institute of Industrial Research is indicated in Bulletin No. 2, listing 30 publications, 104 contributions to periodicals, and 25 patents emanating from the staff during 1929.

Fabricated Structural Steel

Large Volume of New Work Adds Nearly 71,000 Tons to Pending List—Week's Awards About 26,000 Tons

NEARLY 71,000 tons of structural steel work was added to the pending list by the inquiries of the past week. Outstanding jobs are 10,000 tons for a dam near Pasadena, Cal., 9500 tons for another section of the subway in New York, 5000 tons for a Newark, N. J., office building, 5000 tons for a building in Chicago, 5000 tons for two office buildings in Los Angeles and 4000 tons for a coal breaker near Philadelphia. Awards were a little under 26,000 tons and included 4600 tons for an office building in New York and 3400 tons for a municipal building at Camden, N. J. Awards follow:

PENNSYLVANIA RAILROAD, 400 tons, cross arms in Philadelphia-Trenton electrification, to Phoenix Bridge Co.
 READING RAILROAD, 430 tons, bridge No. 62-29, route 160, south of Tuckerton, Pa., to Phoenix Bridge Co.
 READING, PA., 180 tons, extension to mill building No. 31, to Shoemaker Bridge Co.
 PHILADELPHIA, 200 tons, building for Gulf Refining Co., to Belmont Iron Works.
 JERSEY CITY, N. J., 1800 tons, hospital, to Lehigh Structural Steel Co.
 BETHLEHEM, PA., 300 tons, building for R. K. Laros Co., to Bethlehem Fabricators, Inc.
 BOSTON, 150 tons, settlement house, to New England Structural Co.
 BOSTON, 100 tons, Nurses' Home, Children's Hospital, to New England Structural Co.
 CAMBRIDGE, MASS., 990 tons, two State bridges, to Boston Bridge Works, Inc., previously reported to Phoenix Bridge Co.
 CAMBRIDGE, 980 tons, Harvard University gymnasium, to Palmer Steel Co.
 POULTNEY, VT., 200 tons, Staso Milling Co. plant, to New England Structural Co.
 HARTLAND, VT., 161 tons, State bridge, to unnamed fabricator.
 ROCKINGHAM, VT., 146 tons, State bridge, to Thomas McCabe, Waltham, Mass.
 NEW YORK, 950 tons, public school No. 10, to Easton Structural Steel Co.
 NEW YORK, 4600 tons, office building on Cedar Street, to Hedden Iron Construction Co.
 NEW YORK, 300 tons, apartment building, to Dreier Iron Works.
 NEW YORK CENTRAL RAILROAD, 300 tons, bridge at Cleveland, to American Bridge Co.
 ROSENDALE, N. Y., 375 tons, Century Cement Corporation, to Pittsburgh Bridge & Iron Co.
 CAMDEN, N. J., 3400 tons, Court House and municipal building annex, to American Bridge Co.
 PHILADELPHIA, 1070 tons, building for University Club, to Shoemaker Bridge Co.
 PENNSYLVANIA RAILROAD, 700 tons, substation contracts, to Lehigh Structural Steel Co.
 PENNSYLVANIA RAILROAD, 500 tons, bridge at Lemoyne, Pa., to American Bridge Co.
 WASHINGTON, 265 tons, substation for Potomac Electric Power Co., to Barber & Ross.
 ATLANTA, GA., 800 tons, Mitchell Street viaduct, to Virginia Bridge & Iron Co.
 SPARTANBURG, S. C., 325 tons, Fairforrest Finishing Co., to Virginia Bridge & Iron Co.
 ROCKHILL, S. C., 475 tons, Rockhill Printing & Finishing Co., to McClintic-Marshall Co.
 VICKSBURG, MISS., 100 tons, Miller Auto Co. garage, to Virginia Bridge & Iron Co.

ASHLAND, KY., 225 tons, plant extension for American Rolling Mill Co., to Jones & Laughlin Steel Corporation.
 CLEVELAND, 500 tons, substation for Cleveland Electric Illuminating Co., to the T. H. Brooks Co.
 JACKSON, MICH., 400 tons, bank and office building for National Union Building Co., to American Bridge Co.
 NIAGARA, WIS., 300 tons, interstate bridge to Iron Mountain, Mich., to Cherus Construction Co., Minneapolis.
 MILWAUKEE, 130 tons, foundry, to Lakeside Bridge & Steel Co.
 SIOUX CITY, IOWA, 2500 tons, highway bridge, to Missouri Valley Bridge & Iron Co., Leavenworth, Kan.
 STATE OF ARKANSAS, 860 tons, highway bridges, to Virginia Bridge & Iron Co.
 DAWSON, OKLA., 250 tons, two airplane hangars, to Virginia Bridge & Iron Co.
 LOS ANGELES, 575 tons, plates, 24-in. electrically welded pipe, to Western Pipe & Steel Co.
 LOS ANGELES, 200 tons, office building addition, Sixth and Olive Streets, to Consolidated Steel Corporation.
 LOS ANGELES, 150 tons, school, Western Avenue and Los Feliz Boulevard, to Minneapolis Steel & Machinery Co.
 HONOLULU, 450 tons, power house for Hawaiian Electric Co., to Moore Dry Dock Co., Oakland, Cal.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

STATE OF NEW YORK, 110 tons, bridge on route 31, section 7, Walkill River; John S. McGreevy, Matasquan, N. Y., general contractor.
 STATE OF NEW JERSEY, 2000 tons, highway bridge over Hackensack River.
 PHILADELPHIA, 1500 tons, building at Thirteenth and Locust Streets; Foundation Co., general contractor.
 PHILADELPHIA, 200 tons, bridge at Hunting Park Avenue; Mundy Paving Co., general contractor.
 AUGUSTA, ME., 125 tons, opera house.
 WATERTOWN, ME., 100 tons, church.
 NEW HAVEN, CONN., 850 tons, City Hall.
 STATE OF NEW YORK, 500 tons, highway bridges.
 NEW YORK, 3750 tons, additions to Queensborough Bridge roadway; bids rejected.
 NEW YORK, 600 tons, bridge at Ludlow Avenue in Bronx.
 NEW YORK, 750 tons, housing station at West Farms Road and 174th Street.
 NEW YORK, 9500 tons, section 6, route 166, subway on Grand Boulevard and Grand Concourse.
 BROOKLYN, 1200 tons, bulkhead wall at Gravesend Bay.
 NEWARK, 5000 tons, Newark-Plaza Building for Lefcourt Realty Holding Co.
 TRENTON, N. J., 1500 tons, high school.

PHILADELPHIA, 4000 tons, coal breakers at Locust Summit and St. Nicholas, Pa., for Philadelphia & Reading Coal & Iron Co.

PITTSBURGH, 2000 tons, freight terminal for Pennsylvania Railroad.

AKRON, OHIO, 2000 tons, hangars to be built in various cities by Goodyear Tire & Rubber Co.

MICHIGAN CITY, IND., 500 tons, factory building.

MOLINE, ILL., 2800 tons, building for International Harvester Co.

CHICAGO, 5000 tons, revised plans for Fine Arts Building; bids open June 17.

CHICAGO, 1000 tons, building for West Town Bank.

CHICAGO, 1000 tons, girder spans for Burnham Avenue viaduct.

CHICAGO, 7000 tons, Patterson Estate building; previously reported to require 5000 tons.

PEORIA, ILL., 3000 tons, highway bridge at Cedar Street.

ROCKFORD, ILL., 750 tons, factory building.

MINNEAPOLIS, MINN., 700 tons, Kresge store.

MILWAUKEE, 3000 tons, Northwestern Mutual Life Building.

KANSAS CITY, MO., 2000 tons, Professional Building.

OMAHA, NEB., 1000 tons, addition to telephone building.

PASADENA, CAL., 10,000 tons plates and shapes, dam over San Gabriel for city; bond election June 18.

LOS ANGELES, 195 tons plates, 24-in. electrically welded steel pipe line; Western Pipe & Steel Co., low bidder.

LOS ANGELES, 2000 tons, office building, 740 South Olive Street; P. J. Walker, general contractor.

LOS ANGELES, 3000 tons, office building, Fifth and Grand Streets; P. J. Walker Co., general contractor.

LOS ANGELES, 600 tons, exhibit building, Pomona State Fair Grounds; bids June 17.

SANTA MONICA, CAL., 750 tons, office building, Third and Santa Monica Streets; general contract to Orndorff Construction Co.

PULLMAN, WASH., 300 tons, field house for State College; Minneapolis Steel & Machinery Co., low bidder.

TACOMA, WASH., 576 tons, Tacoma Avenue viaduct; bids June 11.

SEATTLE, 160 tons, addition to City-County Building; bids June 3.

SEATTLE, 500 tons plates, penstock, Diablo Power tunnel project; bids May 31.

WALLA WALLA, WASH., 190 to 230 tons plates, 24-in. riveted pipe line; bids May 29.

VALE, ORE., 125 tons plates, 153-ft. diameter siphon, Vale project; bids June 25.

Machine Tool Distributors, Chicago district, is the name of an organization recently formed by machine dealers and direct factory representatives who for some time have been operating under the Chicago plan of handling purchases of used tools when traded in against purchases of new tools. The following officers have been elected: J. R. Porter, Marshall & Huschart Machinery Co., president; E. P. Essley, E. L. Essley Machinery Co., treasurer; N. A. Booz, Federal Machinery Sales Co., secretary. The executive committee is composed of J. R. Porter, E. P. Essley, E. H. Wachs, H. K. Jackson and N. A. Booz.

Non-Ferrous Metal Markets

Copper Dull But Steady, Tin Goes to New Low Level, Zinc Quiet and Easier

NEW YORK, May 28.

Consumption and shipments of the non-ferrous metals continue at virtually the same rate as in recent weeks, but buying is in small volume. This situation applies to all of the metals. Tin has reached the lowest price since July, 1924.

Copper.—Aside from one inquiry for 2,500,000 lb., the demand for copper in the past week has shown no improvement over the lassitude of the past several weeks. The inquiry mentioned is understood to have been covered by the purchase of both ingot copper and copper wire. The price of electrolytic copper remains fairly firm at 18c., delivered, and reports of slight concessions are generally discredited by the larger producers. The feature of chief interest in the market is that consumption and shipments are at an unabated rate, but forward buying is so light that consumers must soon come into the market if they are to continue to use copper at anywhere near the present volume. A good deal of June metal for domestic and export shipment is still to be purchased, and some of this business is expected to develop at any time. During the past six weeks forward sales for export have been at a declining rate, which has averaged 11,000 tons a week. As foreign buyers must anticipate their wants a little further ahead than domestic consumers, it is figured that some export buying is to be expected very soon. Published predictions of a decline in the copper price to 15c. or 16c. have caused no little comment, but in the face of such predictions the leading producers maintain a firm attitude on prices. The next few weeks may give the market a more severe test than it has had recently. Custom smelters are not selling all of their intake, but the primary producers have large backlogs. The stock market situation has had a discouraging effect on all non-ferrous metals, copper included.

Tin.—The price of pig tin, at 43.37½c. per lb. today, reached a new low level, the lowest since July, 1924. A large quantity of the metal for nearby delivery is pressing for sale and this partly accounts for the market weakness. Another influence is the weakness in London, where the efforts of a group to support the price at £200 have not been successful. This group,

THE WEEK'S PRICES. CENTS PER POUND FOR EARLY DELIVERY

	May 28	May 27	May 25	May 24	May 23	May 22
Lake copper, New York.....	18.12½	18.12½	18.12½	18.12½	18.12½	18.12½
Electrolytic copper, N. Y.*.....	17.75	17.75	17.75	17.75	17.75	17.75
Straits tin, spot, N. Y.	43.37½	43.37½	43.37½	43.50	43.50	43.75
Zinc, East St. Louis.....	6.60	6.60	6.65	6.65	6.65	6.65
Zinc, New York.....	7.00	7.00	7.00	7.00	7.00	7.00
Lead, St. Louis.....	6.75	6.75	6.75	6.75	6.75	6.75
Lead, New York.....	7.00	7.00	7.00	7.00	7.00	7.00

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

Rolled Products

Prices on rolled non-ferrous products are unchanged from those prevailing one week ago.

List Prices, Per Lb., f.o.b. Mill

On Copper and Brass Products, Freight up to 75c. per 100 Lb. Allowed on Shipments of 500 Lb. or Over.

Sheets—	
High brass	23.25c.
Copper, hot rolled	26.75c.
Zinc	10.25c.
Lead (full sheets).....	11.00c. to 11.25c.
Seamless Tubes—	
High brass	23.25c.
Copper	29.25c.
Rods—	
High brass	21.25c.
Naval brass	24.00c.
Wire—	
Copper	19.87½c.
High brass	23.75c.
Copper in Rolls	
26.75c.	
Brazed Brass Tubing.....	
30.87½c.	

Aluminum Products in Ton Lots

The carload freight rate is allowed to destinations east of Mississippi River and also to St. Louis on shipments to points west of that river.

Sheets, 0 to 10 gage, 3 to 30 in. wide	33.00c.
Tubes, base	42.00c.
Machine rods	34.00c.

Chicago Warehouse

(Prices Cover Trucking to Customers' Doors in City Limits)

Sheets—	
Base per Lb.	
High brass	23.25c.
Copper, hot rolled	27.75c.
Copper, cold rolled, 14 oz. and heavier	30.00c.
Zinc	10.00c.
Lead, wide	11.90c.
Seamless Tubes—	
Brass	28.25c.
Copper	29.25c.
Brass Rods	
21.25c.	
Brazed Brass Tubes.....	
31.00c.	

New York or Cleveland Warehouse

Delivered Prices, Base Per Lb.

Sheets—	
High brass	21.12½c. to 22.12½c.
Copper, hot rolled, base sizes	27.75c. to 28.75c.
Copper, cold rolled, 14 oz. and heavier, base sizes	30.00c. to 31.00c.
Seamless Tubes—	
Brass	26.00c. to 27.00c.
Copper	29.12½c. to 30.12½c.
Brazed Brass Tubes.....	
29.12½c. to 30.12½c.	
Brass Rods	
18.87½c. to 19.87½c.	

New York Warehouse

Delivered Prices, Base Per Lb.

Zinc sheets (No. 9), casks	10.50c. to 11.00c.
Zinc sheets, open.....	11.50c. to 12.00c.

Metals from New York Warehouse

Delivered Prices, Per Lb.

Tin, Straits pig.....	45.50c. to 46.50c.
Tin, bar	47.50c. to 48.50c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	19.00c.
Zinc, slab	7.75c. to 8.25c.
Lead, American pig.....	7.75c. to 8.25c.
Lead, bar	9.75c. to 10.25c.
Antimony, Asiatic	11.00c. to 11.50c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	25.00c. to 26.00c.
Alum. ingots, No. 12 alloy, 24.00c. to 25.00c.	
Babbitt metal, commercial grade, 30.00c. to 40.00c.	
Solder, ½ and ½	29.50c. to 30.50c.

Metals from Cleveland Warehouse

Delivered Prices Per Lb.

Tin, Straits pig.....	47.63c.
Tin, bar	49.63c.
Copper, Lake	19.50c.
Copper, electrolytic	19.25c.
Copper, casting	18.75c.
Zinc, slab	7.75c. to 8.00c.
Lead, American pig	7.75c. to 8.00c.
Lead, bar	10.00c.
Antimony, Asiatic	16.00c.
Babbitt metal, medium grade.....	19.00c.
Babbitt metal, high grade.....	51.63c.
Solder, ½ and ½	30.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged customers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible.....	14.00c.	16.00c.
Copper, hvy. and wire	13.75c.	15.00c.
Copper, light and bottoms	12.00c.	13.00c.
Brass, heavy	8.25c.	9.00c.
Brass, light	7.00c.	8.00c.
Hvy. machine composition	11.25c.	12.50c.
No. 1 yel. brass turnings	9.25c.	10.00c.
No. 1 red brass or compos. turnings..	11.00c.	12.00c.
Lead, heavy	5.50c.	6.00c.
Lead, tea.....	4.50c.	5.50c.
Zinc	3.50c.	4.25c.
Sheet aluminum.....	14.00c.	16.00c.
Cast aluminum.....	12.50c.	14.50c.

it is reported by cable, has been buying insistently, but has not been able to put prices up. In fact, they are lower than one week ago. Today's London quotations were £195 15s. for spot standard, £198 15s. for future standard and £197 15s. for spot Straits. The Singapore price was £200 15s. The present weakness is in spot tin. Future deliveries are higher. For example, the price for August shipment today was 43.75c. per lb., against 43.37½c. for spot. Sales in the past week did not exceed 800 tons.

Lead.—Producers of lead are awaiting a revival of forward buying. Some June metal is to be bought, but it may be that consumers will be content to cover their requirements on a hand-to-mouth basis as some are doing now. The price situation is unchanged. At St. Louis, the usual quotation is 6.75c., though this is occasionally shaded. The New York contract price of the American Smelting & Refining Co. continues at 7c.

Zinc.—Although some producers are holding for 6.80c. per lb., East St. Louis, not much is being sold at that figure, as there seems to be enough zinc obtainable at 6.60c. to satisfy the moderate demand, and some sales at 6.55c. are reported. Ore production last week was 12,000 tons, as compared with 12,500 tons in the week before. Shipments of ore were only 9409 tons, so there has been a further increase in stocks, which now total about 34,000 tons. The ore price is unchanged at \$44.

Antimony.—The price continues at 9c. per lb., duty paid, New York.

Nickel.—Ingot nickel in wholesale lots is quoted at 35c. per lb., shot nickel at 36c. and cathodes of electrolytic nickel at 35c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable at the published price of 23.90c. per lb., delivered.

Non-ferrous Metals at Chicago

CHICAGO, May 28.—Prices for zinc and antimony are higher in a market that is quiet. Quotations for tin are lower. The old metal market is less active than a week ago and prices are leaning to the weak side.

Prices per lb., in carload lots:

Lake copper, 18.12½c.; tin, 44.50c.; lead, 6.85c.; zinc, 6.62½c.; in less-than-carload lots: antimony, 10.12½c. On old metals we quote copper wire, crucible shapes and copper clips, 14.50c.; copper bottoms, 11.50c.; red brass, 11.50c.; yellow brass, 8c.; lead pipe, 4.50c.; zinc, 3.75c.; pewter, No. 1, 24.50c.; tin foil, 26c.; block tin, 36c.; aluminum, 12.87½c.; all being dealers' prices for less-than-carload lots.

Combined deliveries of brass and bronze ingots and billets by members of the Non-Ferrous Ingot Metal Institute in April amounted to 10,199 tons, according to announcement made by the institute.

Reinforcing Steel

Awards of 5800 Tons—New Inquiries Call for 3200 Tons

AWARDS of about 5800 tons of reinforcing steel included 1250 tons for a court house in Milwaukee, and 900 tons for a railroad freight building in St. Louis. New inquiries of 3200 tons are headed by 1200 tons for a viaduct in Chicago.

NEW YORK, 100 tons of mesh, Floyd Bennett airport on Barren Island, to American Steel & Wire Co.

CHIMNEY ROCK, N. J., 175 tons, highway from Chimney Rock to Raritan, to Igoe Brothers.

CLEVELAND, 160 tons, locomotive inspection shops for Cleveland Union Terminals Co., to Pattison-Leitch Co.

GOSHEN, IND., 340 tons, highway bridge, to Concrete Engineering Co.

MILWAUKEE, 1250 tons, County Court House building, to Kalman Steel Co.

STATE OF WISCONSIN, 160 tons, road work, to Concrete Steel Co.

AURORA, ILL., 130 tons, commercial building, to Olney J. Dean & Co.

EVANSTON, ILL., 114 tons, garage, to Concrete Steel Co.

CHICAGO, 250 tons, garage at Fifty-fifth Street and Lake Park Avenue, to Calumet Steel Co.

MINNEAPOLIS, 600 tons, grain elevator for Washburn-Crosby Co., to an unnamed bidder.

ST. LOUIS, 900 tons, freight building for Terminal Railway Association, to Laclede Steel Co.

SEATTLE, 271 tons, viaduct on Harbor Avenue, to unnamed bidder.

MONTECITO, CAL., 119 tons, Montecito Water Co., to Contractors' Supply Co.

SAN FRANCISCO, 600 tons, San Francisco Stock Exchange Building, to Soule Steel Co.

SAN FRANCISCO, 100 tons, apartment building, Clay and Jones Streets, to W. C. Hauck & Co.

OAKLAND, 455 tons, warehouse B for Port Commission, to Gunn, Carle & Co.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

BOSTON, 225 tons, Children's Hospital Nurses' Home.

MATAWAN, N. J., 300 tons, highway from Matawan to Holmdel; Jannarone Construction Co., Newark, N. J., general contractor.

PITTSBURGH, 100 tons, Sawmill Run Boulevard; John F. Casey, general contractor.

CLEVELAND, 200 tons, Henry Street culvert for County Commissioners; general contract placed.

CLEVELAND, 100 tons, Stumpf Road trestle for County Commissioners; general contract placed.

CLEVELAND, 100 tons, Midland Bank; bids taken.

INDIANA HARBOR, IND., 100 tons, office building for Inland Steel Co.

CHICAGO, 1200 tons, Burnham Avenue viaduct; Great Lakes Construction Co., low bidder.

CHICAGO, 100 tons, store at Milwaukee Avenue and Division Street.

CHICAGO, tonnage being estimated, addition to Lying-In Hospital.

CHICAGO, tonnage not stated, factory on Belmont Avenue; Olsen & Urbain, architects.

CHICAGO, tonnage not stated, revised plans for Fine Arts Building; bids open June 17.

PASADENA, CAL., 750 tons, dam on San Gabriel River; bond election June 18.

Kennecott Copper and Chase Are to Merge

The Kennecott Copper Corporation, 120 Broadway, New York, has arranged for a merger with Chase Companies, Inc., Waterbury, Conn., manufacturer of brass and copper specialties. The latter company will be developed as a fabricating branch. Its present consumption of approximately 5,000,000 lb. of copper monthly will be doubled within the next year. The new plant of the Chase organization now in course of construction near Cleveland will be pushed to completion.

Changes in Carborundum Sales Personnel

The Carborundum Company of Niagara Falls, N. Y., announces several changes among the personnel of its sales department. C. J. Steuber, who has been district sales manager with headquarters at Milwaukee, has been appointed district sales manager at Detroit, in the Carborundum Building, 2759 East Grand Boulevard, that city. Mr. Steuber succeeds Anthony Dobson, who is retiring from active business.

H. E. Kerwin has been appointed as district sales manager at Milwaukee to succeed Mr. Steuber. Robert

ert Rainnie, a member of the Carborundum sales engineering staff, will take over Mr. Kerwin's old territory in the Chicago district.

Announcement is also made of the appointment of George Harden as sales manager for Germany, with headquarters at the Deutsche Carborundum Werke, Düsseldorf. He has been a member of the Carborundum sales force for Flint, Saginaw, and Bay City, Mich. J. C. Gallen, who covered Lansing and Ann Arbor, will succeed Mr. Harden, and H. S. Monroe succeeds Mr. Gallen. In the grinding wheel department at Detroit, Philip R. Dumas succeeds Mr. Monroe.

Large Generating Unit to Be Built

Contracts have been placed with the Allis-Chalmers Mfg. Co. covering equipment for the extension of the Waukegan, Ill., generating station of the Public Service Co. of Northern Illinois, including a 65,000-kw. tandem steam turbine unit with condenser, circulating water and condensate pumps. This is the fourth Allis-Chalmers unit for this station. The first was rated 25,000 kw., and was installed in 1923. A 35,000-kw. unit was installed in 1925 and a 50,000-kw. in 1927.

PERSONAL

HARRY LOEB, manager of sales in New York for the Lukens Steel Co., Coatesville, Pa., was elected president of the Master Boiler Makers' Supply Men's Association, at a meeting last week at Atlanta.

C. E. SHOMO has been elected general manager of the Majestic Steel Cabinet Co., 4217 Belle Plain Avenue, Chicago, manufacturer of household steel cabinets.

B. F. MOHR, assistant to the vice-president of the Illinois Steel Co., will sail June 5 on a ten weeks' trip to England and Continental Europe.

WILLIAM S. MOSSMAN, has resigned as sales, production and advertising manager of the Dudlo Mfg. Co., maker of wire and insulated wiring, Indianapolis, to join the firm of Mossman-Yarnelle Co.

LOUIS PEIK, chief engineer of the American Foundry Equipment Co., Mishawaka, Ind., will shortly leave for France, Germany and England, arriving in London in time to participate in the foundry congress in that city.

B. W. BROWN has been advanced to district sales representative of the Lincoln Electric Co., with headquarters at Milwaukee. G. O. FORTSETH, formerly sales representative

at Detroit, has been promoted to district sales representative at Minneapolis.

A. W. GAEBELEIN, New York, who for eight years has been the Eastern representative of the machinery division of the New Britain Machine Co., will devote himself to the screw products and shop furniture made by the New Britain Machine Co. which recently turned over the machinery end of its business to the New Britain-Gridley Machine Co. The sales of the New Britain-Gridley Machine Co., formerly handled by Mr. Gaebel-ein, will be taken care of by the New Britain office.

JOHN H. WYNNE, consulting engineer, has moved his office to 30 Church Street, New York.

EDWIN H. PEIRCE, formerly vice-president and general manager of the Niles Tool Works Co., Hamilton, Ohio, has become vice-president and general manager of the Atwood Machine Co., Stonington, Conn. He was earlier superintendent of the South Works, Worcester, Mass., of the American Steel & Wire Co.

EARL V. HIGBIE has been made superintendent and AUSTIN L. STOWELL, engineer, of the Stanley Rule & Level Co., New Britain, Conn., plant.

Steel Plate Floors Being Investigated American Institute of Steel Construction Considering "Battleship Deck" Construction of Buildings

THE American Institute of Steel Construction is investigating the possibilities of steel plate floor construction for buildings, which, it is stated, will give greater strength and stability to buildings, reduce the loads on the columns and therefore be especially valuable in skyscraper construction.

Lee H. Miller, chief engineer of the institute, is in charge of the investigation.

This type of flooring would be new for buildings, but it has been used for battleships and for the charging floors of open-hearth furnaces. For bridge floor construction it has been common to use a combination of steel beams with checker plates. Checker plate floors are also used constantly for stair treads and landings.

"By the use of steel plates and ordinary structural steel beams," said Mr. Miller, "it is proposed to develop a welded steel floor which will be better than any floor that has been used before and will stand every service it may be subjected to. It will be a

floor in which it is possible to determine in advance the stresses in all parts and a floor that will recover instantly a full 100 per cent of its deflection, due to live load, when that load is removed. The only objection to such a floor system is that it has not been used before."

Such floors would be built by the use of 3-in., 4-in. or 5-in. I-beams or whatever depth is necessary, spaced 24 in. apart and spanning from girder to girder of the structural steel frame. Along the tops of these beams would be laid continuous steel plates 3/16 in. or 1/4 in. thick and wide enough to leave a space between their edges about 1/4 in. wide. The edges of the plates would be immediately over the center line of the webs of the small beams, and an automatic welding machine then would work along this joint between the plates and weld the edges together, and at the same time weld them to the top flange of the beam immediately over the web. The result would be a built-up T-section, with the plate acting as the upper

flange and the beam acting as the vertical part of the T. Mr. Miller says that the neutral axis of the combined T-section would be close to the top flange of the beam, and when the lower flange of the beam is stressed 18,000 lb. per sq. in., the plates and the top flange would have a stress of only 3000 to 4000 lb. per sq. in.

Such a floor construction, he said, would carry a load of 190 lb. per sq. ft. on a 10-ft. span with a deflection of 0.07 in. The same floor would carry a total load of 85 lb. per sq. ft. on a 15-ft. span with a deflection of 0.157 in. The weight of the steel work, including beam and plates for the floor, would be 10 1/2 lb. per sq. ft.

The cost of welding the bead between the edges of the plate and to the top of the beams has been estimated by different contractors, Mr. Miller said. One of them has stated that with automatic machinery it should be possible to deposit the bead weld for less than 2c. a linear foot. Another contractor has said he would be willing to make a contract to weld this flooring at between 3c. and 4c. per sq. ft. The total cost of a floor constructed of 3-in. I-beams, 3/16-in. plates, covered on top with cork tile and fireproofed on the under side with metal lath and plate, would be in the neighborhood of \$1 per sq. ft., according to Mr. Miller.

In tall buildings subjected to wind stresses this type of floor, it is stated, would act as a girder to prevent any torsional distortion.

Coming Meetings

June

National Association of Purchasing Agents. June 3 to 6. Annual meeting, Hotel Statler, Buffalo. George A. Renard, 11 Park Place, New York, secretary.

International Foundrymen's Association. June 11 to 15. Third foundry exhibition and congress, London, England.

Association of Iron and Steel Electrical Engineers. June 17 to 21. Annual meeting, William Penn Hotel, Pittsburgh. John F. Kelly, Empire Building, Pittsburgh, managing director.

Fourth International Management Congress. June 19 to 23. Paris. American participation handled by joint committee representing the American Society of Mechanical Engineers, Taylor Society, American Management Association and Society of Industrial Engineers.

American Society for Testing Materials. June 24 to 28. Annual meeting, Chalfonte Haddon Hall, Atlantic City. N. J. C. L. Warwick, 1315 Spruce Street, Philadelphia, secretary.

American Refractories Institute. June 25. Annual meeting, Keystone Athletic Club, Pittsburgh. Dorothy A. Texter, 2218 Oliver Building, Pittsburgh, secretary.

Society of Automotive Engineers. June 25 to 28. Summer meeting, Saranac Inn, upper Saranac Lake, N. Y. C. F. Clarkson, 29 West Thirtieth Street, New York, general manager.

OBITUARY

HENRY MARCUS LANE, well-known mechanical engineer and for a number of years president of the Lane & Bodley Co., Cincinnati, steam engine manufacturer, died May 16 in the Cleveland Clinic Hospital disaster. He was born in Cincinnati in 1854 and studied at the Massachusetts Institute of Technology, returning to his native city in 1875 to become associated with the Lane & Bodley Co., of which his father was president. Upon his father's death in 1890 he assumed the presidency of the company, retaining this position until his death. However, he retired from active participation in the business about 10 years ago. He gained prominence many years ago as builder of inclined plane and tramway railroads. He was a member of the American Society of Mechanical Engineers.

JOHN F. RAE, chief inspector at the National works, National Tube Co., McKeesport, Pa., died suddenly in Venezuela, S. A., on May 22, where he had gone recently on a business trip. He had been associated with the company for about 30 years, most of that time at the McKeesport works.

JAMES EVANS VANDEVENTER, secretary of the Mid-States Steel Co., Anderson, Ind., died May 21, of a heart attack in his office, following injuries sustained recently in an automobile accident. He was 68 years old.

G. EVANS AVERY, sales manager, American Metal Products Co., Milwaukee, died May 21, after a long illness, aged 53 years. He had been connected with the company for ten years.

PETER W. FREDERICKS, founder and president of the Badger Steel Post Co., Milwaukee, died May 19, aged 72 years.

GEORGE F. KENT, manager industrial relations department, Bucyrus-Erie Co., South Milwaukee, Wis., died suddenly on May 22, aged 49 years. He entered the employ of the Bucyrus company in 1902 as an office boy and became industrial relations manager in 1914.

FLOYD A. CHAPMAN, former superintendent of the tin mill of the American Sheet & Tin Plate Co., Gary, Ind., died May 11, following a long illness, aged 53 years. He remained in Gary until 1922, when he left for Newcastle, Pa., to assume charge of the tin mills in that city.

FREDERICK M. STRONG, formerly prominent in the tin plate industry in

the Middle West, died in Springfield, Mass., May 19, aged 80 years. He served successively as secretary of the Laughlin Nail Co., Martins Ferry, Ohio, general manager, American Tin Plate Co., Elwood, Ind., and president, Juniata Steel & Iron Co., Greencastle, Ind.

HUGH KENNEDY, president, Seneca Iron & Steel Co., Buffalo, and for many years prominently identified with the steel industry in the Pitts-



HUGH KENNEDY

burgh district, died at his home in Buffalo on May 23, aged 73 years. He was born at Poland, Ohio, and attended the Poland Union Seminary. In 1880 he entered the employ of the Edgar Thomson works, Carnegie Steel Co., Braddock, Pa., as assistant to the superintendent. Later he had charge of the Isabella furnaces at Etna, Pa., and subsequently was manager of the furnace department of the American Steel Hoop Co. when it purchased the Isabella Furnace Co. In 1902 he went to Buffalo as vice-president and general manager of the Rogers-Brown Iron Co. He had been identified with the Seneca company for a number of years. He was active in philanthropic work in Buffalo. JULIAN KENNEDY, consulting engineer in Pittsburgh, is a brother.

HENRY W. BLAKE, senior editor of the *Electric Railway Journal* and for 38 years identified with it and its predecessors, died at his home in Englewood, N. J., May 20. He was born in New Haven Dec. 7, 1865, and was graduated from Yale University in 1886. After a course in electrical engineering at the Massachusetts Institute of Technology and an engagement with a Sprague electric railroad and motor company, he became identified with electric transportation

journalism in 1891, succeeding three years later to the editorship of the then *Street Railway Journal*. He was a great editor, who gave unstintingly toward the solutions of the problems growing out of the evolution of the cable and electric railroads and latterly involving the coordination of the motor bus with electric railroads.

J. C. BLAIR, one of the directors of A. G. Kidston & Co., Ltd., Glasgow, notice of whose death on May 15 was received by cable and printed in *THE IRON AGE* of last week, had been connected with the Kidston company for 45 years. He started with the firm when 19 years of age and in 1897 went to London to establish the firm's office in that city. He was one of the founders of the Iron and Steel Exchange, London, and was a member of its management committee.

WILLIS H. DIEFENDORF, president Diefendorf Gear Corporation, Syracuse, N. Y., died May 25. He had been identified with the gear-making business since 1899, first with what became the New Process Gear Co., and later with the company which he organized. He was born in Vienna, N. Y., in 1869 and was graduated in 1887 from the Onondaga Academy of Syracuse University. Between 1889 and 1899 he was with the Straight Line Engine Co., Syracuse. He was one of the leading spirits in the American Gear Manufacturers' Association, particularly in its early days, when he served on its executive committee.

Coke Production Still Remains Large

WASHINGTON, May 28.—Total production of by-product coke in April amounted to 4,456,944 net tons and of beehive coke 467,700 tons, according to the Bureau of Mines. The consumption of coking coal in April is estimated at 7,156,000 net tons, of which 6,429,000 tons was charged into by-product ovens and 727,000 tons in beehive ovens. Consumption of coal at by-product plants in April represented an increase of 762,331 tons, or 13.5 per cent, over that of the corresponding month last year.

Compared with the average daily rate of consumption prevailing in the previous month, the figures for April show a decrease of 0.2 per cent, the consumption in April being at the rate of 214,304 tons a day, against 214,720 tons in March.

Examination for a patent examiner, to fill a vacancy in the Navy Department, Washington, is announced by the Civil Service Commission. The entrance salary is \$3,800 a year. Applications must be filed not later than June 26. Full information may be obtained from the Civil Service Commission, Washington, or at the post office or custom house in any city.

Little Improvement in European Steel

Dullness Features Most Markets—British Pig Iron and Tin Plate Are Strong—
International Steel Cartel May Gain Italian Adherence

(By Cable)

LONDON, ENGLAND, May 27.

THE Government has appointed a committee to investigate and report on the situation in steel scrap, an acute shortage of which is seriously handicapping steel mill operations.

Pig iron is strong with domestic and export demand well sustained and Cleveland makers sold up until October. Supplies are scarce and output is to be increased in June by blowing in two Jarow furnaces. More furnaces will be needed if the full demand is to be met. Hematite makers are well sold ahead and not booking orders for delivery beyond June. Price advances are being considered.

The steel market has been quiet since the holiday, but inquiry is improving. Plate mills are still insufficiently provided with tonnage, but mills rolling shapes and lighter products are better engaged.

Less Continental iron and steel is arriving and new business here is slack, consumers apparently awaiting the result of the general election. Continental works are offering semi-finished steel and merchant bars more freely and are inclined to grant concessions, but buying is limited.

Tin plate is firm on improved demand and prices are expected to advance as a result of increasing costs and substantial payments to the association by some works which have overproduced. Makers are well sold ahead and orders are being booked for delivery next year.

Galvanized sheets are quiet and prices steady. Indian buying is slow, but a revival is expected in June when the usual seasonal buying should develop. Some sellers claim, however, that India is already well stocked with sheets. Japanese demand for thin-gage black sheets is limited,

except for small lots of heavy gages.

Edsel Ford has cut the first sod for the new Ford plant at Dagenham, which is to be completed in two years and will employ 15,000 workers. The first contract for steel work, involving about 2000 tons of bars, is reported to have been placed.

Luxemburg production in April was 235,000 metric tons of pig iron and 226,000 tons of raw steel. There were 38 furnaces in blast on April 30. The Saar output in April was 178,000 metric tons of pig iron and 186,000 tons of raw steel with 28 furnaces in blast on May 1.

Italy May Join Cartel

Luxemburg Company May Aid Leading Italian Mill to Re-finance If It Becomes Cartel Member

MILAN, ITALY, May 14.—German representatives of the International Steel Cartel have again approached Milan producers through the Banca Commerciale, with an invitation to join the cartel. A greater measure of success is expected than when Frederick Thyssen, in February, 1927, had several conferences here with Italian

metallurgists, and at least one long conversation with Signor Mussolini, in Rome.

The inclusion of Italy in the International Steel Cartel, although by no means certain, is more probable today than it has been. The Banca Commerciale, having acquired, by purchase, the interests held by the Credito

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works with American equivalent figured at \$4.85 per £ as follows:

Durham coke, del'd....	£0 18½s. to £0 19s.	\$4.48 to \$4.60
Bilbao Rubio ore.....	1 3	6.18
Cleveland No. 1 foundry	3 11	17.21
Cleveland No. 3 foundry	3 10	16.97
Cleveland No. 4 foundry	3 7½	16.37
Cleveland No. 4 forge..	3 7	16.25
Cleveland basic (nom.)	3 7½	16.37
East Coast mixed.....	3 13½	17.70
East Coast hematite....	3 14	17.94
Rails, 60 lb. and up....	7 15 to 8 15	37.59 to 42.43
Billets	6 7½ to 6 10	30.91 to 31.52
Ferromanganese	13 15	66.69
Ferromanganese (export)	13 10 to 14 0	65.47 to 67.90
Sheet and tin plate bars, Welsh	6 5 to 6 7½	30.31 to 30.91
Tin plate, base box....	0 18½ to 0 18¾	4.45 to 4.53
Black sheets, Japanese specifications	13 5	64.26
C. per Lb.		
Ship plates	7 12½ to 8 2½	1.66 to 1.76
Boiler plates	9 0 to 10 10	1.95 to 2.27
Tees	8 2½ to 8 12½	1.76 to 1.86
Channels	7 7½ to 7 17½	1.60 to 1.71
Beams	7 2½ to 7 12½	1.55 to 1.65
Round bars, ¾ to 3 in.	7 12½ to 8 2½	1.65 to 1.76
Steel hoops	9 0 to 10 0	1.95 to 2.16
Black sheets, 24 gage..	10 5 to 10 10	2.21 to 2.27
Galv. sheets, 24 gage..	13 12½ to 13 15¾	2.94 to 2.98
Cold rolled steel strip, 20 gage (nom.).....	12 0	2.64

*Ex-ship, Tees, nominal.

Continental Prices F.O.B. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 0.50 to 0.90 per cent phos.	£3 7½s. to £3 12s.	\$16.37 to \$17.45
Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	3 12	17.45
Billets, Thomas	5 3 to 5 7	24.98 to 25.94
Sheet bars, Thomas....	5 7 to 5 8	25.94 to 26.19
Wire rods Low C. No. 5 B.W.G.....	6 5 to 6 6¼	30.31 to 30.61
Black sheets, No. 31 gage, Japanese.....	12 12½	61.16
Rails, 60 lb. and heavier	6 10*	31.52
Rails, light	6 0	29.10
C. per Lb.		
Steel bars, merchant...	5 18 to 6 0	1.28 to 1.29
Steel bars, deformed...	5 17 to 5 17½	1.27 to 1.28
Beams, Thomas, British standard	5 5 to 5 6½	1.14 to 1.15
Channels, Thomas, American sections....	6 1	1.31
Angles, Thomas, 4-in. and larger, over ¾-in. thick	5 10	1.15
Angles, Thomas, 3-in..	5 14	1.23
Ship plates, open-hearth, inspected	7 10	1.62
Hoop and strip steel, over 6-in. base.....	6 7½	1.38
Wire, plain, No. 8 gage	7 11½	1.67
Wire, galvanized, No. 8 gage	9 9 to 9 12½	2.05 to 2.12
Wire, barbed, 4-pt. No. 12 B.W.G.....	11 19	2.58
Wire nails, base.....	7 19	\$1.72 per keg
Wire nails, assortments, 1 to 6-in. keg.....	10 9	2.26

*Open-hearth steel, 7½s. (\$1.82) per ton extra.

Italiano in the Ilva Iron & Steel Co. (Alti Forni e Acciaierie d'Italia), of Naples, is now in a position to dictate so far as the cooperation of the largest and most important iron and steel works in Italy is concerned. If the Ilva company advocates joining the cartel, other interests such as Ansaldo, Cogne-Giraud and Ernesto Breda may follow.

The Ilva works annually consumes about 200,000 tons of ore from Elba, and operates a large foundry at Torre Annunziata. As an inducement to the Ilva company to join, a Luxemburg company has offered to obtain the funds to increase the company's capital of 300,000,000 lire, and retire its heavy indebtedness to the banks. Italian metallurgists have hitherto refrained from any combinations or agreements with French and Belgian or German members of the industry, but the present negotiations may possibly lead to a working arrangement.

The majority of the plants in Italy are active and are well supplied with Government orders for locomotives and rolling-stock for the state railroads, warships, and aircraft for the air force. A rule has been enforced that no foreign material shall be used in the construction of any of these products, except when the necessary material cannot be obtained in Italy.

The Ernesto Breda Co. is being financed by Dillon, Read & Co., New York, who loaned to them recently \$5,000,000 to help them out with their large orders on hand, which comprise railroad rolling-stock, steel and heavy machinery.

Polish Exports of Tubes and Rails

HAMBURG, GERMANY, May 11.—Poland, which is not a member of the International Rail Makers' Association, last year exported 15,510 metric tons of rails, compared with 15,700 tons in 1927. Poland is a member of the International Tube Cartel and its 1928 exports of tubes, at 57,510 tons, comprised two-thirds of the total steel exports of the country. In 1927 tube shipments to other countries were 39,120 tons.

Higher Tube Prices Result in Plans for Danish Mill

HAMBURG, GERMANY, May 11.—The renewed International Tube Cartel has not been in effect very long, but the decided upward movement of pipe prices is causing some concern among the principal consuming countries in Europe—Denmark, Sweden, Norway, Finland, Switzerland and the Balkan States.

The discount on black gas pipe, which was 82 per cent of the British list prices of 1921, early in March, has been decreased to 75 per cent. It is reported that Swedish steel mills, associated with important merchants in Stockholm, Sweden, and Copenhagen, Denmark, who will lose their tube

agencies under the new distribution plan of the cartel, will erect a tube mill near Copenhagen. A site in Denmark has been selected, as that country has no import duty on skelp. Plans are for a mill with an annual production of 12,000 tons, to be increased if necessary. Definite action has not yet been taken, but is expected shortly.

British Unifying Control of World Tin Production

Unified control of world tin production has recently made rapid strides among British tin interests, according to a report from London to Doremus & Co., New York. The London Tin Syndicate has consolidated 22 tin mining companies under one management in less than four years. Last year, collaborating with the Anglo-Oriental Mining Corporation, the London Tin Syndicate formed the London Malayan Tin Trust, Ltd., which brought 16 Malayan tin dredging companies together. Further announcements of combinations under a central control are expected shortly.

Italy Expects Large Pig Iron Output This Year

MILAN, ITALY, May 14.—Output of pig iron has shown a considerable increase. Imports, the bulk of which are still from the United Kingdom, now average more than 60,000,000 lire (\$3,138,000) annually, but for 1929 are expected to show a decline to not more than 50,000,000 lire (\$2,615,000).

The productive capacity of the 12 blast furnaces, not all of which are in operation at present, is about 800,000 tons annually, but the output in 1927 was only 465,091 tons. This year it is estimated that at the present rate of pig iron output the total production will be more than 700,000 tons.

American Group to Study European Gray Iron

A study of the various methods employed in the manufacture of gray iron castings in the leading European countries will be made by three members of the board of directors of the Gray Iron Institute, Cleveland, who accompanied other American foundrymen to London to attend the third International Foundrymen's Congress. The institute committee is headed by A. E. Hageboeck, Frank Foundries Corporation, Moline, Ill. The other members are Fred Erb of the Erb-Joyce Foundry Co., Vassar, Mich., and Detroit, and William J. Grede, Liberty Foundry, Inc. Wauwatosa, Wis., and the Spring City Foundry Co., Milwaukee. This committee, it is expected, will gather much information that will be of value to the institute in its recently organized program of

establishing standard classifications of gray iron. The manufacture of high strength gray iron has been developed to a considerable extent in some of the European countries.

Big Gain in Output of Farm Equipment in 1928

WASHINGTON, May 28.—Production of farm equipment in 1928 was valued at \$522,654,464, compared with \$460,881,111 for 1927 and \$461,399,522 for 1926, according to the Bureau of the Census. The 1928 total represented an increase of 13.4 per cent over that for 1927 and 13.3 per cent over that for 1926.

The production values for the more important classes of farm equipment are as follows: Tractors—1928, \$191,978,126; 1927, \$159,530,521; 1926, \$145,912,489. Harvesting machinery—1928, \$67,292,509; 1927, \$57,319,248; 1926, \$46,006,889. Machines for preparing crops for market or use—1928, \$33,428,355; 1927, \$32,328,555; 1926, \$34,126,745. Plows and listers—1928, \$31,990,558; 1927, \$29,477,372; 1926, \$33,148,358. Planting and fertilizing machinery—1928, \$25,963,538; 1927, \$24,560,375; 1926, \$26,590,991.

The large increase shown for most of the larger sizes of tractor-drawn plows, for combines (harvester-threshers), and for wheel-type tractors of more than 24 hp. are indications of the growing trend of agriculture toward the abandonment of antiquated farm machinery and the adoption of more modern labor-saving devices. The numbers of three-bottom and larger tractor-drawn moldboard plows and four-disk and larger tractor drawn disk plows manufactured and increased from 17,226 in 1926 to 26,149 in 1927 and to 48,458 in 1928; the number of combines (harvester-thresher) increased from 11,760 in 1926 to 18,307 in 1927 and to 25,392 in 1928. The production of wheel-type tractors of more than 24 hp. increased from 46,849 in 1926 to 48,245 in 1927 and to 79,553 in 1928.

Portland Cement Output Increases Heavily

Production of Portland cement in April is reported by the United States Bureau of Mines at 13,639,000 bbl., which is an increase of more than 1 per cent over the 13,468,000 bbl. of April, 1928. It is, however, lower by 3 per cent than the 14,048,000 bbl. of April, 1927. For the four months, production has totaled 42,011,000 bbl., compared with 42,256,000 bbl. last year.

Shipments of cement in April were 13,319,000 bbl., compared with 13,307,000 bbl. last year. In March, the total was 10,113,000 bbl. For the four months, shipments amounted to 34,587,000 bbl., compared with 36,546,000 bbl. in 1928.

Iron and Steel Exports Still Gain

April Total Second Highest in Eight Years—Finished Steel in Four Months One-Third Above 1928

WASHINGTON, May 25.—Making a gain of 6655 gross tons over March, exports of iron and steel products from the United States in April totaled 277,580 tons. This was the largest monthly outflow since August, 1928, with a total of 287,297 tons, which was the highest since February, 1921, when exports were 393,328 tons. For the four months ended with April exports amounted to 1,082,512 tons, or 253,807 tons in excess of those for the corresponding period of last year.

Imports in April were 54,337 tons, an increase of 1675 tons over those for March, but for the four months ended with April, with an aggregate of 219,938 tons, there was a decline of 35,070 tons from the total of incoming shipments for the first four months of 1928. The daily average of

exports in April was 9253 tons, compared with 8740 tons in March. The daily import movement in April was 1811 tons, against 1702 tons in March.

Although April exports were greater than those during March, there were decreases in most of the classes. They were small, however, and were more than offset by increases in the other classes. Principal among the increases were: Rails, 10,092 tons; scrap, 6559 tons; skelp, 4945 tons; pig iron, 3548 tons, and plates, 2891 tons. The more important decreases were in plain shapes, 3895 tons; casing and oil line pipe, 2872 tons; black and galvanized welded pipe, 2213 tons, and black steel sheets, 1961 tons.

Of the 21,369 tons of rails exported in April, 5797 tons went to Chile;

4200 tons to Cuba; 3850 tons to Canada; 2425 tons to the Philippine Islands, and 2023 tons to Japan. The principal distribution of tin plate exports, amounting to 25,991 tons, was to China, 7228 tons; Japan, 6782 tons; Canada, 4504 tons; Italy, 1236 tons, and Hong Kong, 833 tons. Canada took 9499 tons of the 22,032 tons of steel bars exported; Japan, 5630 tons; the United Kingdom, 1636 tons; Cuba, 706 tons, and Chile, 571 tons.

Canada was the destination of shipments of 18,771 tons of the 20,790 tons of plain heavy structural steel exported during April and of 14,619 tons of the 18,006 tons of steel plates entering foreign markets. Of the 14,615 tons of black steel sheets exports, 8817 tons went to Canada; 2646 tons to Japan; and 1249 tons to Argentina. Exports of black and

Exports of Iron and Steel from the United States (In Gross Tons)					Imports of Iron and Steel into the United States (In Gross Tons)				
April		Four Months Ended April			April		Four Months Ended April		
1929	1928	1929	1928		1929	1928	1929	1928	
Pig iron	7,631	3,701	19,601	15,954	Pig iron	6,693	20,095	47,672	53,764
Ferromanganese	86	1,324	821	3,463	Ferromanganese*	7,372	2,566	22,294	13,441
Scrap	42,621	40,652	150,988	126,580	Ferrosilicon†	636	367	2,843	1,212
Pig iron, ferroalloys and scrap	50,338	45,677	171,410	145,997	Ferrochrome‡	20	36	99	224
Ingots, blooms, billets, sheet bar	6,441	1,354	14,148	8,158	Scrap	7,584	1,953	29,778	11,168
Skelp	11,377	6,303	24,877	24,751	Pig iron, ferroalloys and scrap	22,305	25,017	102,686	79,809
Wire rods	4,551	2,711	17,089	10,160	Steel ingots, blooms, billets and slabs	2,610	1,635	7,849	6,104
Semi-finished steel	22,369	10,368	56,114	43,069	Wire rods	1,339	1,075	4,482	6,474
Steel bars	22,032	12,660	85,651	43,226	Semi-finished steel	3,949	2,710	12,331	12,578
Alloy steel bars	1,501	1,543	9,495	4,339	Rails and splice bars	13	1,230	984	5,501
Iron bars	514	613	2,242	1,405	Structural shapes	12,300	16,577	42,089	58,394
Plates, iron and steel	18,006	10,043	69,471	44,034	Boiler and other plates	1,220	80	2,275	460
Sheets, galvanized	14,404	12,534	62,474	50,460	Sheets and saw plates	1,068	992	4,965	9,482
Sheets, black steel	14,615	11,681	63,305	55,816	Steel bars	3,437	8,212	11,190	34,895
Sheets, black iron	1,117	1,417	4,646	4,673	Bar iron	299	355	1,089	815
Hoops, bands, strip steel	8,059	4,161	30,350	16,595	Hoops, bands and cotton ties	2,664	2,934	6,394	10,814
Tin plate;terne plate	25,991	19,809	103,543	80,361	Tubular products (wrot.)	2,565	6,211	13,854	14,157
Structural shapes, plain material	20,790	13,653	84,267	52,019	Nails, tacks, staples	549	688	2,362	2,334
Structural material, fabricated	7,157	6,908	40,656	23,639	Tin plate	3	97	92	166
Steel rails	21,369	24,449	67,678	78,390	Bolts, nuts, rivets and washers	26	22	93	87
Rail fastenings, switches, frogs, etc.	3,408	3,786	11,506	22,939	Round iron and steel wire	778	478	2,504	1,449
Boiler tubes	1,565	1,134	6,661	5,697	Barbed wire	742	272	1,993	1,258
Casing and oil line pipe	9,479	7,366	57,151	34,106	Flat wire; strip steel	160	153	595	741
Black and galvanized welded pipe	11,616	6,145	47,885	34,483	Steel telegraph and telephone wire .....	.....	.....	.....	36
Malleable iron screwed pipe fittings	1,151	740	4,447	2,800	Wire rope and strand	193	92	802	498
Plain wire	4,146	3,163	18,830	15,207	Other wire	47	43	187	231
Barbed wire and woven wire fencing	5,137	7,240	23,884	24,270	Rolled and finished steel	26,064	38,456	91,468	141,318
Wire cloth and screening	116	84	620	561	Cast iron pipe	1,778	6,566	12,688	19,842
Wire rope	586	267	2,679	1,746	Castings and forgings	241	198	765	1,461
Wire nails	1,355	1,790	6,493	5,477					
Other nails and tacks	1,123	1,046	3,884	3,395					
Horseshoes	6	30	130	142					
Bolts, nuts, rivets and washers, except track	1,281	1,062	5,687	3,992					
Rolled and finished steel	196,524	153,324	813,635	609,772					
Cast iron pipe and fittings	2,470	1,605	10,949	10,814					
Car wheels and axles	1,745	861	9,435	4,421					
Iron castings	1,267	937	5,090	4,600					
Steel castings	531	731	4,049	3,248					
Forgings	1,027	819	5,554	2,298					
Castings and forgings	7,040	4,953	35,077	25,381					
All other	1,309	861	6,276	4,486					
Total	277,580	215,183	1,082,512	828,705					

*Manganese content only.
†Silicon content only.
‡Chromium content only.

Destination of Iron and Steel Exports from the United States (In Gross Ton)

Countries of Destination	April, 1929	January Through April		Countries of Destination	April, 1929	January Through April	
		1929	1928			1929	1928
North and Central America and the West Indies.....	144,852	524,372	392,762	Netherlands	275	1,153	888
Canada and Newfoundland...	120,758	423,999	316,949	Poland and Danzig	8,496	29,281	14,611
Cuba	8,679	26,697	21,647	Rumania	457	1,391	1,002
Guatemala	970	3,020	4,857	Soviet Russia in Europe.....	461	1,865	1,360
Honduras	665	5,355	3,106	United Kingdom	4,370	20,261	16,599
Mexico	7,267	28,339	24,394	Other Europe	1,802	7,423	5,975
Panama	1,343	8,011	6,138	Far East	71,158	265,240	223,685
Salvador	1,280	3,795	866	British Malaya	735	3,806	2,652
British West Indies.....	1,156	10,252	2,455	China	10,594	33,443	43,964
Other West Indies.....	1,954	11,259	9,588	Netherlands East Indies....	5,390	31,754	9,272
Other Central America.....	780	3,645	2,762	India and Ceylon.....	576	7,997	10,869
South America	33,429	166,874	143,742	Japan	39,285	129,523	113,178
Argentina	5,704	39,667	30,604	Kwantung	693	7,144	1,914
Brazil	7,267	24,513	30,837	Philippine Islands	10,365	36,942	33,608
Chile	8,552	26,032	25,253	Australia	1,484	7,120	5,343
Colombia	3,192	19,653	23,674	New Zealand	697	1,865	850
Peru	2,408	14,478	10,046	Other Asia and Far Eastern markets	1,339	5,646	2,035
Uruguay	322	4,779	3,064	Africa	753	7,052	4,947
Venezuela	5,489	35,861	17,124	Union of South Africa.....	411	2,347	2,420
Other South America.....	495	1,891	2,140	Egypt	74	3,562	1,580
Europe	27,388	118,974	63,569	Mozambique	125	380	308
Belgium	435	1,555	5,025	Other Africa	143	763	639
France	428	7,507	1,409	Total	277,580	1,082,512	828,705
Germany	1,894	7,546	6,239				
Italy	8,770	40,992	10,461				

galvanized welded pipe went chiefly to Japan, the United Kingdom and Argentina, while practically all of the skelp was shipped to Canada. The bulk of scrap exports went to Canada, Japan and Poland.

North and Central America and the West Indies took 52.1 per cent of the April exports. For the four months ended April 30 exports to this geographical group were 48.5 per cent of the total. Shipments to South America in April were 12.1 per cent of the total, while for the four months they were 15.4 per cent. Exports to Europe in April were 9.9 per cent of the total and for the four months, 11 per cent. Exports to the Far East were 25.6 per cent of the total in April; for the four months they were 24.5 per cent.

The principal sources of total April imports were Canada, 11,226 tons; Germany, 11,031 tons; Belgium, 10,015 tons; France, 5744 tons; Sweden, 3483 tons, and Norway, 3217 tons.

Principal increases in imports in April were in hoops and bands, 1652 tons over March; steel bars, 1569

tons; ferromanganese, 1277 tons; and scrap, 1121 tons. The major decreases were in cast iron pipe, 2724 tons; pig iron, 1879 tons; and "other" pipe, principally seamless tubes, 1258 tons. Of the 12,300 tons of structural shapes imported in April, 5515 tons came from Germany, 5212 tons from Belgium and 1414 tons from France.

France supplied all of the cast iron pipe imported and Germany 1344 tons of the 2565 tons of "other" pipe imports. Ferromanganese imports of 7372 tons came principally from Canada, 2987 tons; Norway, 2823 tons; United Kingdom, 1315 tons; and Italy, 229 tons. Of the 30,577 tons of manganese ore imported, 16,583 tons came from Soviet Russia; 8468 tons from Brazil, and 5514 tons from India.

Canadian Pig Iron Output Declined in April

April production of pig iron in Canada amounted to 79,341 gross tons, according to figures compiled by the Dominion Bureau of Statistics. This output was the lowest this year. It was 8 per cent under the 86,176 tons reported for March, but 6 per cent above the 74,736 tons produced in April, 1928. April output showed a decline in basic and malleable grades, while foundry iron advanced from 7958 tons in March to 19,039 tons in April; basic iron dropped from 74,070 tons in March to 57,639 tons in April; malleable iron fell off from 4148 tons in March to 2663 tons in April.

For the four months ended with April, the production of pig iron amounted to 347,220 gross tons, an increase of 23 per cent over the 282,823 tons reported for the corresponding four months last year.

The Dominion Iron & Steel Co. blew out one blast furnace at Sydney, N. S., leaving two in blast. Other active furnaces are two at Hamilton,

Ont., operated by the Steel Co. of Canada, Ltd., and two at Sault Ste. Marie, Ont., of the Algoma Steel Corporation. The six furnaces now active have a capacity of 2475 tons per day, or 60 per cent of the total in Canada.

Production of ferroalloys in April, at 5744 tons, was slightly under the 5972 tons of March.

Output of steel ingots and direct steel castings, at 122,102 gross tons in April, was the second highest since 1918, having been exceeded only in March of this year, when the production amounted to 137,158 tons.

Shipments of Fabricated Structural Steel High

WASHINGTON, May 21.—Orders for fabricated structural steel in April totaled 272,838 tons, according to reports received by the Department of Commerce from 209 firms with a monthly capacity of 308,695 tons, the rate of output being 88 per cent. March orders aggregated 295,864 tons, representing 93 per cent of the monthly capacity of 319,000 tons of 231 firms reporting for that month.

Computed bookings in April were 338,800 tons, against 358,050 tons in March, while computed shipments were 304,150 tons, or 79 per cent of capacity, against 277,200 tons, or 72 per cent of capacity in March. Shipments made the highest total since last October; with that exception, the highest in several years.

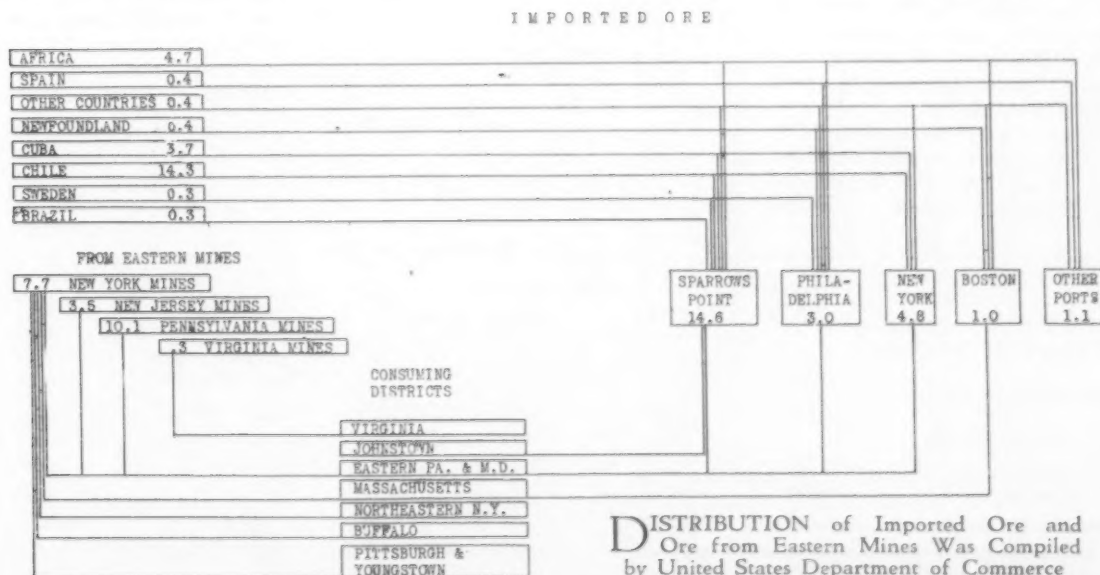
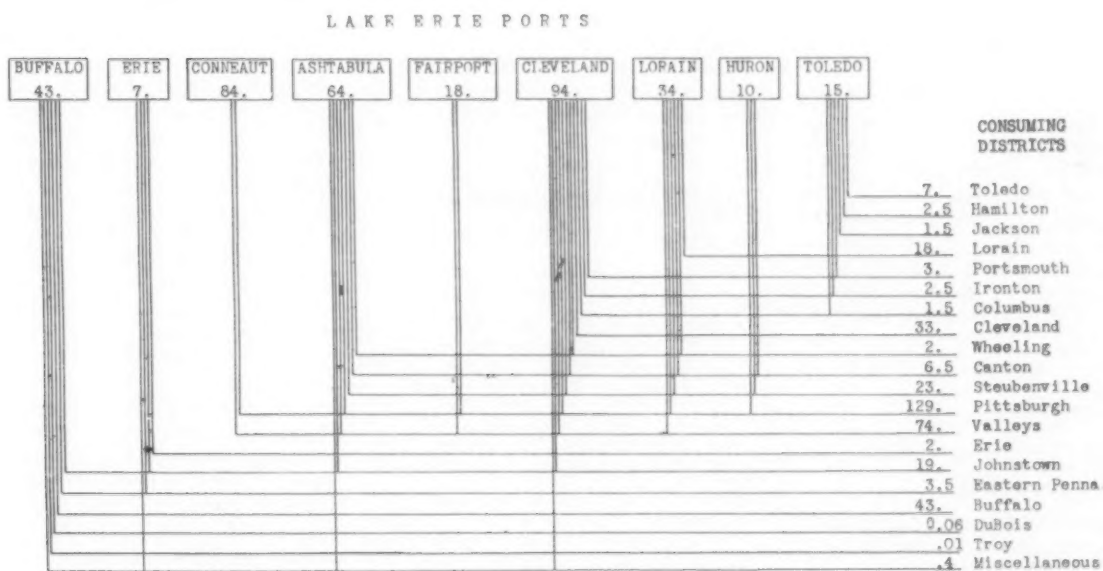
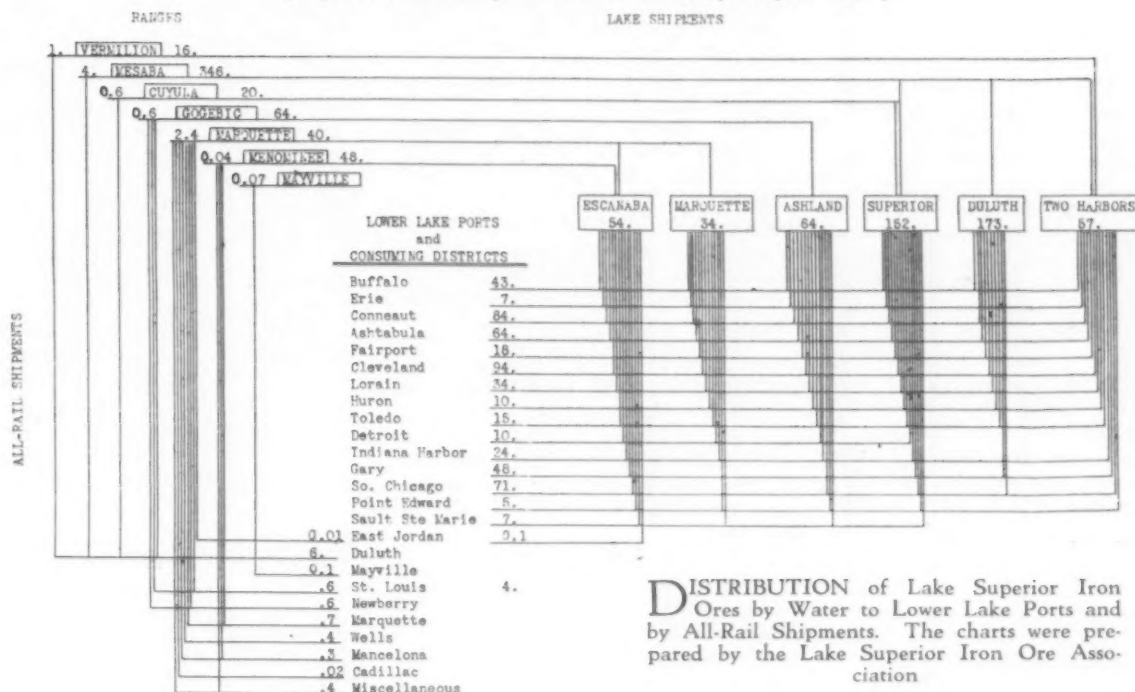
Computed orders for the first four months were 1,239,700 tons, against 966,350 tons for the corresponding period of last year. Computed shipments were 1,101,100 tons and 900,900 tons respectively. New orders have run 12½ per cent ahead of shipments, so far this year, compared with an excess of a little over 7 per cent in four months last year.

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS (In Gross Tons)

	April	March
Austria	24	44
Belgium	10,015	6,316
Czechoslovakia	30	13
France	5,744	6,751
Germany	11,031	12,828
Italy	310	265
Netherlands	1,261	2,493
Norway	3,217	1,247
Sweden	3,483	2,822
Switzerland	19	11
United Kingdom	5,981	8,045
Europe	41,115	40,835
Canada	11,226	10,684
Mexico	31	33
Cuba	61	...
Virgin Islands	75	...
British India	1,826	1,107
China	1	1
Hong Kong	1	1
Japan	3	1
Total	54,337	52,662

Sources and Distribution of Iron Ore in 1928

(Figures Indicate Quantities in Units of 100,000 Tons)



Fabricated Steel Plate Orders Fall Off

WASHINGTON, May 24.—Orders for fabricated steel plate in April totaled 40,675 tons, or 50.9 per cent of the capacity of the 48 firms reporting to the Department of Commerce. This shows a substantial decline from March orders, amounting to 57,869 tons, or 72.4 per cent of capacity.

April orders for fabricated plates consisted of 9984 tons for oil storage tanks, against 22,045 tons in March; 2137 tons for refinery materials and equipment, compared with 7492 tons; 442 tons for tank cars, against 6771 tons; 2483 tons for gas holders, against 5656 tons; 2452 tons for blast furnaces, compared with 631 tons; and 23,167 tons for stacks and miscellaneous purposes, compared with 15,274 tons.

Orders for the first four months of the current year aggregated 189,933 tons, against 182,794 tons for the corresponding period of last year. February and March orders were the largest monthly totals in several years.

Ohio River Steel Traffic Gained in April

Movement of steel products on the Ohio River in the Pittsburgh district during April, according to the United States Engineer's Office, Pittsburgh, amounted to 105,472 net tons, as compared with 97,147 tons in the previous month and with 110,356 tons in April, 1928. April commerce in iron and steel products on the Monongahela River totaled 99,067 tons, as against 93,627 tons in March and 87,587 tons in the corresponding month last year. Allegheny River movement in steel amounted to 210 tons in April, 1929, 25 tons in March and 470 tons in April, 1928.

Iron Ore Imports Increased in April

WASHINGTON, May 25.—April imports of iron ore amounted to 284,134 gross tons, representing a gain of 39,971 tons from March, which in turn showed a slightly greater tonnage than February. Compared with last year, April showed a gain of almost 60,000 tons.

Chile, as for many months, furnished approximately half the total tonnage. Cuba was in second position. Sweden, having recovered

apparently from the strike, took third place, ahead of French Africa, which a year ago was in second place.

For the four months, total imports reached 948,021 tons, or practically 80,000 tons more than last year. This gain was accounted for by an increase of almost 82,000 tons in ore received from Cuba.

Chief among the other changes compared with last year was an almost complete stoppage of ore from Canada, which amounted last year to more than 42,000 tons, a quadrupling of ore from Sweden and a drop to 100,000 tons in receipts from French Africa, which last year stood second and this year fourth.

Large Increase in Structural Welding

The number of buildings erected by the use of electric arc welding has been tabulated by Prof. Frank P. McKibben.

In a list published a year ago in *General Electric Review*, the number of welded buildings was 43, and the present total is given as 65. If to this total are added bridges and ships, the total is 95 as against 63 for a year ago.

Professor McKibben states:

"The most notable advance has been in the increased height and size of buildings in which arc welding has been used. Heights of 180 ft. have been reached."

Iron Foundry Operation Above Normal

Production by gray iron foundries during April was 133.1 per cent of normal, compared with 135.4 per cent in March, according to the monthly report of the Gray Iron Institute, Cleveland, based on returns from 102 foundries. These had an output of 31,439 tons during the month, compared with an average monthly production of 23,614 tons during the past three years. Unfilled orders reported by 59 foundries April 1 were 174.4 per cent, compared with 118.1 per cent March 31.

Foundry operations in Ohio increased to 113.1 per cent of normal in April, compared with 108.8 per cent in March, according to the monthly trade report of the Ohio Foundry Association, Inc. In April a year ago the operations were on the basis of 108 per cent.

Heavy April Production of Malleable Castings

WASHINGTON, May 24.—Showing a decline of 6103 tons, orders for malleable castings in April totaled 81,158 tons, against 87,261 tons in March. The rate of operations was 87.7 per cent of capacity in April, based on a total of 95,705 tons, and 87.8 per cent of capacity in March, based on a total of 95,363 tons.

Production in April was 83,933 tons, compared with 83,733 tons in March while shipments were 80,870 tons and 81,425 tons respectively. Production in April was the heaviest in many months.

Orders for the first four months of 1929 were 323,315 tons, against 259,091 tons during the corresponding period of last year; production, 314,709 tons and 259,881 tons; shipments, 310,633 tons and 252,668 tons; and per cent of capacity operated, 82.6 and 67.1.

Gain in Employment in Ohio Iron and Steel Plants

Employment in the Ohio iron and steel industry during April was 3 per cent higher than in March and 11 per cent higher than in April, 1928, states the current bulletin of the Bureau of Business Research of Ohio State University. Of the branches within the industry, sheet metal manufacturers were the most active, April employment having been 8 per cent higher than in March and 30 per cent higher than in April, 1928. The number of wage earners in steel plants and rolling mills was 2 per cent greater in April than in March and 6 per cent greater than in April last year.

In the machine tool group April employment showed a decline of 2 per cent from March, but was 34 per cent higher than in April, 1928. Companies manufacturing automobiles and automobile parts reported that employment in April was 2 per cent lower than in March, but 35 per cent greater than in April, 1928. Industrial employment in Ohio in April, based on figures from 801 companies, was 2 per cent greater than in March and 10 per cent greater than in April, 1928.

Steel Boiler Orders Gain

WASHINGTON, May 27. — Orders were placed in April for 1703 steel boilers with 1,768,512 sq. ft. of heating surface, according to reports received by the Department of Commerce from 81 manufacturers. This compares with 1466 boilers with 1,558,224 sq. ft., ordered in March. The April orders included 1689 stationary boilers with 1,742,730 sq. ft., the remaining 14 being Scotch and other types of marine boilers.

The total of steel boilers ordered during the first four months of the current year was 5216, with 5,775,531 sq. ft., compared with 5444, with 5,207,450 sq. ft., during the corresponding period of last year.

SOURCES OF AMERICAN IMPORTS OF IRON ORE
(In Gross Tons)

	April		Four Months Ended April	
	1929	1928	1929	1928
Canada		3,288	162	42,133
Cuba	55,500	26,086	213,500	131,786
Chile	140,600	120,000	494,312	482,900
Spain			18,368	5,250
Sweden	33,485	13,271	73,028	19,614
French Africa	30,620	57,622	59,180	159,646
Other countries	23,929	4,614	89,471	26,921
Total	284,134	224,881	948,021	868,250

Furnace Control and Steel Quality

(Continued from page 1496)

same furnace used formerly for 25 tons. The bath depth has increased from 12 or 15 in. to 24 in., but no difference in quality is observable.

Similar results came from a shop which has a row of 80-ton furnaces, in conjunction with two of about twice that size. But a man who has recently completed a 145-ton furnace, with a bath 43 ft. long and 38 in. deep, said that his quality has made a distinct improvement over that obtained from the smaller units.

It was remarked by the chairman that "everybody has been deepening furnace hearths during the last two years, to get into the ladles the largest tonnage possible."

Comparisons of iron oxide contents of steels made in furnaces of varying depths have been made in the Pittsburgh experiment station of the Bureau of Mines. James Gaines, Jr., reported that there is a much smaller percentage of oxides in steels coming from the deeper baths. Based on a steel of 0.10 per cent carbon, he found the oxides from a bath 46 in. deep as 10. From a 22-in. bath this became 11; from a 16-in. bath, 12; while from the 6-in. bath of the bureau's small experimental furnace it runs as high as 18.

This sequence was attributed by the speaker to the "fact that a certain definite rate of transfer exists, by which the iron oxide passes from the slag into the metal. This is based on the area of contact and is independent of the depth. Hence there is less concentration of the oxide in a steel made in a deep bath."

Use of 2 Per Cent Silicon Spiegeleisen

NO one seemed to be using spiegeleisen containing 2 per cent of silicon. Considerable discussion centered, however, around the use of spiegeleisen of the usual type, containing under 1 per cent of silicon and about 18 to 22 per cent of manganese. A plate steel man found it essential, for cleaning up the bath, in making high-quality steels. He uses 1500 lb. in a 100-ton heat, putting it into the furnace in two doses sometime ahead of the ferromanganese.

In this connection it was said that, if the furnace is tapped 5 min. after spiegeleisen is added, its use is likely to prove detrimental. It has to be allowed to work in, and this takes a little time. The first "dose" is put in 30 min. before the ferromanganese and the second dose 15 or 20 min. before the ferromanganese. Before the spiegeleisen is added the bath has about 0.18 to 0.20 per cent of residual manganese. Attempts to dispense with the spiegeleisen addition have been followed at once by a serious increase in defects. The troubles thus met include snakes, poor working of the steel, more inclusions, etc.

For killed steel one man said that

spiegeleisen would help kill the heat and hold the manganese content in the bath. Another speaker said that its use improves the working of rimming steel. But with high manganese in the pig iron, and a high residual manganese, another operator reported getting no help from spiegeleisen. It seems to be needed, solely as a scavenger, in cleaning up heats made from iron below 1.50 per cent in silicon.

One man reported having had to use a larger pig iron charge when taking iron from blast furnace B than from A, when both furnaces were making iron of the same chemical analyses. These results were averages of several months of operation and were consistent. It was suggested that the physical temperature of the iron might have been a reason, as cold iron is normally higher in sulphur.

When a Heat Melts Soft

Discussion of melting conditions brought out the point that it is desirable to keep the carbon up high enough so that the heat will not melt soft. If it appears that the heat is going to melt soft, one speaker advocated adding hot metal before the lime is up. He believes that he can make better steel by recarburizing with metal. When there is a high metal charge, however, he frequently puts in 20,000 lb. of soft ore.

Another operating man suggested getting the iron in early so that a little ore can be used if necessary. Another man, who is charging about 40 per cent pig iron, tries to get it to melt high enough in carbon to permit using 4000 or 5000 lb. of ore on a 60-ton heat. If it melts soft, it does not give such good results.

One man said he does not wish to make anything of a special nature out of a heat which has melted soft. He is making a large amount of high-carbon steel and likes to have about 30 points leeway in the carbon before tapping. If he is making steel specified for 0.60 per cent carbon, he wants it to melt at 0.85 or 0.90 per cent carbon and would call 0.70 per cent a case of melting low. On the other hand, for soft steel, it might melt down to 0.07 or 0.08 per cent without being too low.

One operator, whose furnaces include both deep and shallow baths, including among the deep baths one of 38 in. in a hearth 30 ft. long and 12 ft. wide, uses spiegeleisen consistently. He reported that he gets more benefit from it in the deep bath than in the shallow. In adding it, he does not expect to recover any manganese from it, but uses it merely to satisfy the slag. He puts in about 500 lb. to clean up the heat. In a 230,000-lb. charge he uses about 1000 lb. of manganese ore and no pig iron. He finds that this works about the same as formerly, when he charged the same furnace with only 165,000 lb.

Before adding spiegeleisen one superintendent puts in 2000 lb. of burnt lime to chill the slag. This is scattered, part being put in at each door. The spiegeleisen then heats this up and makes the slag more fluid. When the heat is in good shape, he gets from 2 to 4 points of manganese out of it. His pig iron averages about 1.35 per cent manganese. The first 750 lb. of spiegeleisen does not stop the action in the bath. The boil occurs about 45 min. ahead of this addition. The second reboil starts about 10 min. after the last spiegeleisen is put in and 10 min. ahead of the addition of ferromanganese.

Action of Deoxidizers

Explaining the action of deoxidizers in the bath when finishing a heat, James Gaines, Jr., of the United States Bureau of Mines, referred particularly to reboiling with ferrosilicon. Iron oxide is diffusing from the slag into the metal. When the ferrosilicon is added, its silicon being turned into silica, this diffusion continues until all the silicon is used up. Then the iron oxide begins being absorbed by the silica present.

No difference is noted between the 50 per cent and the 15 per cent ferrosilicon except that the action of the former is considerably more rapid. In both cases the cleanliness of the bath comes back to the same point after reboiling. The difference between the two products, so far as the silicon-manganese ratio is concerned, introduces another variable, but it works out the same in the end.

Experiments have been made in the experimental furnace at Pittsburgh with both aluminum-silicon deoxidizers and aluminum-manganese deoxidizers. These show little advantage over the use of straight aluminum. In using them the ratios must allow a large margin of safety, for the aluminum will take all the oxygen it can get, and there may not be enough oxygen left to make a fusible inclusion with the silicon.

Regarding the quality of pig iron in open-hearth practice, a high residual manganese gives a good gas elimination during the working of the heat. Other conditions being equal at the start of the heat, there will, with the high residual manganese, be a smaller amount of inclusions of various kinds. Adding ore to a heat with thin slag increases the inclusion content of the bath. A thick slag, on the other hand, partly supports pieces of ore and less inclusions are obtained. This same effect is noticed if fine ore is used, as the small particles will rest on a slag, even if it is not thick.

Making Steel With High Inclusions

ANOTHER representative of the Bureau of Mines told of following through a considerable number of

heats made for producing blanks for seamless steel tubing. The residual manganese worked out at about 0.19 to 0.20 per cent. The heats were tapped very hot—around 2900 to 3000 deg. Fahr.—because of the higher fluidity of such heats, both for the inclusions and the steel, which would tend to permit the inclusions to rise. Manganese-aluminate inclusions were found to hang in clusters all through this steel. Before tapping the heats, however, the furnace tests showed up extremely clean. These furnaces empty 240-ton heats into three or four ladles. The ingot yield expressed in round blanks was about 78 to 79 per cent, with not over 3 per cent rejections, on steel of 0.45 per cent carbon.

It is planned to study the effect and location of inclusions in steel which has been partly rolled and then backed out of the rolls, and also in steel which has been partly pierced. In this connection, an effort will be made to get rid of the inclusions by omitting the aluminum and making the heat completely in the furnace rather than in the ladle. It is believed that this will produce blowholes. The next step then naturally will be to obtain a steel in which both the inclusions and the blowholes are eliminated.

Effect of Impurities in Scrap

SEVERAL times these meetings have discussed the question of tin, copper, lead, antimony and other impurities found in automotive and agricultural scrap. The experience reported at this meeting did not differ from that previously brought out. Certain plants do not accept automobile scrap under any conditions, because of the included non-ferrous metals and the effect which they will have on a heat. Tin in the scrap was said to be one of the worst offenders. Alloy steel scrap cannot be used for automotive sheets.

One man said he would rather have 45 per cent of good pig iron and 55 per cent of bad scrap than to have bad iron and good scrap. He has had trouble with tin, antimony and lead—particularly the latter. The lead, however, does not stay in the metal, but seems to penetrate through the bottom of the hearth without making holes which the steel will follow. Tin and antimony often go with it.

Using a Mixture of Scrap

One procedure was advocated of mixing up the scrap being charged, so that no heat will get a preponderance of the poor-quality material. This plant charges all scrap; as some of it is cast scrap, that is the source of carbon. Carloads of scrap may contain respectively automobile scrap, screw stock and other materials having deleterious contents; hence he does not put all the scrap from any one car into any one heat, but mixes it up.

This plant pays the stockhouse men 1c. a lb. for recovery of non-ferrous metals from the scrap. In this manner about one-quarter of the scrap is

prepared for use. Most of the trouble seems to come from agricultural and automotive bearings which get into the scrap. A metallurgist cautioned against using scrap with tin in it, stating that other elements cause less trouble, although there is some from sulphur. With galvanized scrap the zinc is so volatile that it goes off on exposure to the air and thus does not get into the steel.

One plant rejects a whole car of scrap if any non-ferrous material is found in it. The car is inspected before it goes to the stockhouse. If it passes this inspection and non-ferrous scrap is found in it in process of unloading, the stockman who gives it the secondary inspection rejects what is left of the car.

Improving Drawing Quality

TEMPERATURE and conditions of teeming heats were said to be the important factors in making steel which will satisfactorily draw deeply. With rimming steel of 0.06 to 0.09 per cent carbon and 0.30 to 0.40 per cent manganese, one operator recommended rolling at not under 2200 deg. Fahr. The molds must have a smooth enough surface so that the ingot will not hang anywhere in the mold. The size of the nozzle and the ferrostatic pressure have a bearing. In this plant a 2½-in. nozzle is used, with a ladle so deep that there are 19 sleeve bricks on the stopper for a 115-ton heat. This is teemed at a temperature just high enough to clear the ladle satisfactorily, leaving a skull of 2000 to 4000 lb.

In another shop a still higher rolling temperature is advocated, at around 2300 deg. Action of the steel in the molds in the open-hearth pouring gives an indication as to whether the ingots will be thin or thick skinned. This information is then transmitted to the soaking pit foreman and the heater there knows how to handle his heat. This steel is poured through a nozzle of 1½-in. in a ladle having 17 sleeve brick on the stopper and with heats averaging 93 tons.

There is a constant fight to get the quality desired, was the report of a metallurgist. He believes that, before we have solved this problem completely we shall have to go into a more complete analysis of the steels being made. Present analyses are not adequate for all cases.

We must get the steel clean and free from over-oxidation. Seams are attributed by one operating man to over-use of deoxidizers, particularly when added in the ladle. At the same time, there must be a sufficient amount of phosphorus, or the very thin sheets, such as 31 gage and thereabouts, cannot be opened after being rolled.

Avoiding Splash on Side of Molds

SIDE splash on molds in teeming was attributed in some cases to the use of very deep ladles. To overcome this difficulty, nozzles as long as

15 in. are being used in several cases. Efforts are made to have the steel pourer center the ladle accurately over the mold, but this is not always done.

Ferrostatic pressure in the ladle was blamed for the splashes in one plant, where the heats average 122 tons and the ladles have stoppers with 18 sleeve brick. Molds used in this plant are 19 x 19 in. and 24 x 26 in. The splashes result in a certain amount of scabby billets, which might be avoided with the use of a shallower ladle. To obviate this trouble when sheet bar steel is being poured, one man uses a large nozzle for the purpose of bringing the metal up faster in the mold, and thus melting the splashed material back into the ingot before it has a chance to congeal on the mold wall.

This same method of operation in slab ingots measuring 10 x 24 and 10 x 28 in. was adopted in another plant. Using a 2-in. nozzle, there seldom were found any seams or slabs because of splash. This material was incorporated in the ingot before it had time to oxidize or freeze. These ingots were mostly from 1600 to 2000 lb.

Another mill making plates reported about 75 per cent greater trouble from this cause on top-poured ingots than on bottom-poured. For good results in plates he said that it is out of the question to pour the ingots from the top. At the same time, splashes can be obtained in the bottom-poured practice, and these could cause trouble, although they are much less prevalent.

Refined Primary Lead in 1928

Output of refined primary lead in the United States from domestic ore amounted in 1928 to 626,202 net tons, valued at \$72,639,000, as reported by producers to the United States Bureau of Mines. Production was 6 per cent less than in 1927 and the value was nearly 14 per cent less. There was a decrease in average selling price of lead from 6.3c. a lb. in 1927 to 5.8c. in 1928.

Production of refined lead from foreign ore, principally from Mexico, amounted to 154,869 net tons—an increase of 21 per cent over 1927. Consequently the decrease in the total output of primary lead from all sources was only about 2 per cent (781,071 tons in 1928 and 796,530 tons in 1927).

Nearly 30 per cent of the lead produced from domestic ore was derived from Missouri; nearly 24 per cent was from Utah, and about 22 per cent from Idaho. The remainder was from a number of States, the most important being Oklahoma, Colorado, Kansas and Montana.

Apparent consumption of refined primary lead in the United States in 1928 amounted to about 658,000 net tons, as compared with about 663,000 tons in 1927 and 718,000 tons in 1926.

Machinery Exports Still Heavy

April Shows Decline, but Four-Month Total Is

One-Third Ahead of Last Year—

Imports Heavier

WASHINGTON, May 25.—Exports of machinery of all kinds from the United States in April, 1929, were valued at \$51,371,056, a decline of \$8,136,739 from the March total. For the four months ended April 30, however, machinery exports aggregated \$207,329,981, an increase of \$55,351,331 over the corresponding period of 1928. The April exports showed a gain of \$13,991,111 over those during April of last year.

Exports of industrial machinery, as listed by the Division of Statistics, Department of Commerce, were valued at \$23,516,044 in April, against \$26,778,042 in March and \$17,278,671 in April of last year. For the four months ended April, 1929, they were valued at \$93,896,987, compared with \$68,375,944 for the corresponding period of last year.

April exports of power-driven metal-working machinery were valued at \$2,804,788, compared with \$3,788,077 in March, and \$1,830,754 in April of last year. For the four

months this class of exports was valued at \$11,690,618, compared with \$7,820,850 for the corresponding period of 1928. Exports of hand-driven metal-working machinery in April were valued at \$8,165,535, against \$9,569,360 in March and \$6,201,977 in April of last year. For the four months they were valued at \$32,789,089, against \$24,874,956 for the corresponding period of last year.

Exports of machine tools as listed by THE IRON AGE were 1079 in number, valued at \$1,408,060, compared with 1016, valued at \$2,031,735 in March.

Total April exports in the machinery group, including vehicles, were \$119,635,060, compared with \$84,930,466 in April of last year. For the four months of the current year the value was \$471,244,066, against \$322,704,865 for the corresponding period of last year. Exports of agricultural implements in April were valued at \$12,031,000, against \$13,858,000 in March and \$8,388,000 in

April of last year. For the four months they were valued at \$48,830,000, against \$33,575,000 for the first four months of 1928.

Imports of machinery continued to increase in April, rising to a value of \$3,015,094 for those listed in THE IRON AGE, compared with \$2,989,389 in the preceding month and \$1,931,934 in April of last year. For the four months they were valued at \$11,031,982, an increase of \$4,358,328 over those for the corresponding period of last year.

Total imports of machinery and vehicles in April were \$3,949,218, against \$2,427,209 in April of last year. For the four months the value was \$14,083,661, a gain of \$5,106,414 over the corresponding period of 1928. Imports of industrial, office and printing machinery in April were valued at \$2,103,589, compared with \$1,378,840 in April of last year. For the first four months they were valued at \$8,161,267, against \$5,227,413 last year.

Machinery Exports from the United States

(By Value, in Thousands of Dollars)

	April		Four Months Ended April	
	1929	1928	1929	1928
Locomotives	\$47	\$147	\$692	\$779
Other steam engines.....	86	71	310	232
Boilers	127	62	616	323
Accessories and parts.....	155	127	1,126	550
Automobile engines	1,579	1,685	5,596	5,163
Other internal combustion engines	1,074	624	3,773	2,328
Accessories and parts.....	440	365	1,587	1,184
Electric locomotives	48	61	279	571
Excavating machinery	983	632	2,710	2,596
Concrete mixers	123	98	535	328
Road-making machinery	329	240	1,000	825
Elevators and elevator machinery	447	388	1,792	1,161
Mining and quarrying mach'y	1,319	986	5,446	4,108
Oil well machinery.....	3,117	1,141	9,057	4,518
Pumps	854	479	4,361	1,720
Bending and power presses...	291	131	1,148	531
Machine tools*	1,521	1,042	6,617	4,529
Forging machinery	141	44	510	255
Other metal-working machinery and parts.....	653	484	2,555	1,881
Textile machinery	989	979	4,844	4,350
Sewing machines	661	692	3,533	2,880
Shoe machinery	161	145	759	626
Flour-mill and gristmill machinery	28	40	207	166
Sugar-mill machinery	287	118	872	1,570
Paper and pulp mill mach'y.	275	301	949	1,252
Sawmill machinery	116	64	328	303
Other woodworking machinery	221	164	760	596
Refrigerating and ice-making machinery	1,587	797	4,852	2,445
Air compressors	657	488	2,666	1,982
Typewriters	1,935	1,736	8,384	7,426
Power laundry machinery....	186	82	663	334
Typesetting machines	397	335	2,157	1,443
Printing presses	489	268	2,406	1,911
Agricultural machinery and implements	12,031	8,388	48,830	33,575
All other machinery and parts	18,017	13,976	75,410	57,543
Total	\$51,371	\$37,380	\$207,330	\$151,979

*Principal items detailed in another table.

Exports of Power-Driven Metal-Working Machinery

	April, 1929		March, 1929	
	No.	Value	No.	Value
Engine lathes	98	\$188,086	86	\$247,094
Turret lathes	49	164,387	90	228,767
Other lathes	83	136,701	86	244,872
Vertical boring mills and chucking machines	8	19,034	26	80,361
Thread-cutting and automatic screw machines..	75	83,687	77	111,019
Knee and column type milling machines	43	107,132	57	136,602
Other milling machines...	50	123,672	89	172,328
Gear-cutting machines....	44	118,722	44	142,640
Vertical drilling machines	28	35,425	49	77,151
Radial drilling machines..	4	8,241	18	46,475
Other drilling machines...	187	100,272	125	52,134
Planers and shapers.....	35	50,864	45	87,006
External cylindrical grinding machines	54	146,800	99	216,950
Internal grinding machines	31	77,970	46	125,720
Metal-working tool-sharpening machines	290	47,067	79	63,516
Total	1,079	\$1,408,060	1,016	\$2,031,735

Imports of Machinery Into the United States

(By Value)

	April		Four Months Ended April	
	1929	1928	1929	1928
Metal-working machine tools.....	\$108,446	\$42,923	\$426,824	\$179,309
Agricultural machinery and implements	1,177,976	598,282	3,544,596	2,071,983
Electrical machinery and apparatus....	184,642	229,651	754,773	757,495
Other power-generating machinery....	62,815	3,767	340,103	32,070
Other machinery....	998,379	836,875	4,342,836	2,712,028
Vehicles, except agricultural	482,836	220,436	1,622,850	920,769
Total	\$3,015,094	\$1,931,934	\$11,031,982	\$6,673,654

Machinery Markets and News of the Works

May Business Slightly Off

Machine Tool Orders This Month Probably Will Not Equal the Total for April

MACHINE tool orders for May probably will not equal the April record, but the volume of buying is still highly satisfactory. Indications point to a moderate recession in buying during the summer months, but this will not materially affect shop operations because most of the machine tool companies now have sufficient unfilled orders to carry them to Aug. 1 or later.

Business during the past week has come from nearly all classes of buyers, but large orders have not been so numerous as in past weeks. Not a

great deal of business is coming from the automobile industry, but aircraft manufacturers are taking a fair amount of equipment.

The farm implement industry promises to take considerable equipment in the next few months. It is estimated at Chicago that several of the larger companies will expend a total of \$1,500,000 for new tools.

The United States Naval Torpedo Station, Newport, R. I., is offering a large list of used machine tools for sale by sealed proposals. Bids must be in by 11 a. m., June 20.

New York

NEW YORK, May 28.—A slight relaxation in the demand for machine tools is noticed by some local sellers. However, there has been no serious falling off in either orders or inquiries, and the volume of business for May is considered highly satisfactory, as it is much above the usual amount for the fifth month. The E. W. Bliss Co., Brooklyn, has bought a number of tools. Prices on shapers have been advanced by some makers.

Reliance Bronze & Steel Corporation, 77 Dobbins Street, Brooklyn, has put its bronze foundry in operation. Plant is equipped to produce castings in monel metal, aluminum, bronze, brass and copper. O. E. Zenker is vice-president.

Brooklyn Borough Gas Co., Mermaid Avenue and West Seventeenth Street, Brooklyn, has plans for two-story equipment storage, distributing and repair plant, to cost about \$200,000. Bloch & Hesse, 18 East Forty-first Street, New York, are architects.

Paramount Brick Works, Inc., 724 Clinton Street, Brooklyn, manufacturer of sand-lime brick, has filed plans for new plant at Lafayette and Zerega Avenues, New York, including boiler plant and machine shop, to cost \$120,000 with machinery. Berlinger & Kaufman, 66 Fifth Avenue, New York, are architects.

George G. Miller, 1482 Broadway, New York, architect, has plans for multi-story automobile service, repair and garage building, to cost about \$200,000 with equipment.

American Aeronautical Corporation, 730 Fifth Avenue, New York, has awarded general contract to Commonwealth Industries, Inc., New York, for aircraft plant and airport on Manhasset Isle, Port Washington, L. I., consisting of main one-story unit, 150 x 580 ft., with two-story portion, 50 x 580 ft., for manufacture of Savoia-Marchetti seaplanes and amphibians; one-story unit, 130 x 418 ft., for assembling and kindred service, and another one-story structure, 130 x 330 ft., for service and repair operations. A fourth unit will be equipped for wing production, etc. Project will include an aeronautical school, with hangars and field buildings, and will cost more than \$1,200,000 with equipment. Company is operating plant at Whitestone, L. I., and will remove to new site when buildings are ready. Lockwood, Greene Engineers, Inc., 1 Pershing Square, New York, is engineer. Enea Bossi is president.

New York Steam Corporation, 280 Madison Avenue, New York, is planning new power house for central steam service, to cost \$400,000 with equipment.

Nahon Co., 447 East Fifty-second Street, New York, manufacturer of furniture, has purchased five-story building at 432 East Fifty-sixth Street, totaling 75,000 sq. ft. floor space, and will remove to new location. Additional equipment will be installed.

Segal Lock & Hardware Co., 155 Leonard Street, New York, with plant at 55 Ferris Street, Brooklyn, has acquired Universal Safety Razor & Blade Corporation, New York, and will consolidate. Increased capacity will be developed.

Department of Plants and Structures,

Municipal Building, New York, will soon begin construction of new radio broadcasting station of 200 watts power.

Charles Freshman Co., 240 West Fortieth Street, New York, manufacturer of radio equipment and devices, has organized Freshman-Freed-Elseman Radio, Ltd., in conjunction with Canadian interests, with capital of \$400,000, to operate a plant near Toronto, where headquarters will be established. C. A. Earl, president of Charles Freshman Co., heads new organization.

National Electric Products Corporation, operated by American Copper Products Corporation, Bayway, Elizabeth, N. J., has plans for one-story plant, 96 x 360 ft., to cost about \$100,000 with equipment.

Packard Motor Car Co. of New York, 198 Central Avenue, Newark, has plans for three-story service, repair and sales building, 200 x 206 ft., on Central Avenue, to cost \$250,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect. Headquarters are at Broadway and Sixty-first Street, New York.

Passaic Valley Sewerage Commissioners, 24 Branford Place, Newark, Joseph H. Quigg, clerk, will receive bids until June 18 for a new pumping unit at Newark Bay pumping station, including one pumping engine direct-connected to centrifugal pump with capacity of 100 million gal. per 24 hr.

Colonial Airways Corporation, 270 Madison Avenue, New York, is arranging for construction of hangar, 120 x 120 ft., at Newark Metropolitan Airport, Newark, to be built by city and occupied under long-term lease. A side extension will be built for machine shop, repair and parts department. Unit will cost about \$85,000 with equipment.

Board of Education, Caldwell, N. J., has authorized installation of manual training department in addition to Grover Cleveland High School, to cost \$450,000, for which plans will be drawn by Guilbert & Betelle, 24 Branford Place, Newark, architects.

Marvin Radio Tube Corporation, 76 Coit Street, Irvington, N. J., has leased an adjoining factory totaling about 10,000 sq. ft. floor space for increased capacity.

Tung-Sol Lamp Works, Inc., 95 Eighth Avenue, Newark, has acquired plant and property of Brown & Caine, Inc., 2317 Calumet Avenue, Chicago, manufacturer of condensers, engine equipment for motor boats, etc. It will operate as a subsidiary and increase capacity.

New England

BOSTON, May 27.—New England machine tool builders generally did slightly more business the past week than in the two previous weeks. There is a good demand for automatic machines and multiple drilling tools for which deliveries have been considerably extended this month. A New Hampshire multiple

drilling machine maker has taken some very good business recently.

There is an active inquiry for used equipment, but a scarcity of the tools required. Representatives of new tools, however, have a steady call for machine parts and replacements, which amounts to several thousands of dollars each week for individual houses.

The small tool market continues extremely active and deliveries on certain types of extra high-grade cutting tools are now a question of months instead of weeks. Small tool makers are experiencing the largest business since the war.

Bids close about May 31 for a round-house, machine shop, etc., for Central Vermont Railroad Co. at White River Junction, Vt.

Pumps, power house and miscellaneous equipment are required for a water supply system for Bristol County Agricultural School, Dighton, Mass., plans for which have just been completed.

Harris Whitmore, Jr., Naugatuck, Conn., is erecting a hangar, machine shop and other buildings at Bethany, Conn.

City of New Bedford, Mass., contemplates building a mechanical shop for which metal-working tools will be required. Details will be given out later.

Boston & Maine Railroad Co., Lechmere Square, Cambridge, Mass., has awarded a contract for a one-story engine house addition to cost \$50,000. New machine shop tools may be purchased.

Martin Trailer Co., North Elm Street, Westfield, Mass., has plans for a one-story plant, 80 x 100 ft. A blower system and an electric crane will be required.

United Illuminating Co., 182 Temple Street, New Haven, Conn., on June 1 will start erection on a \$750,000 plant extension. All necessary equipment has not been purchased.

Plans have been filed by Hartford Special Machinery Co., Homestead Avenue, Hartford, Conn., manufacturer of machinery, tools, gears, etc., for one and two-story addition, 70 x 82 ft., to cost \$35,000 with equipment. Buck & Sheldon, Inc., 60 Prospect Street, is architect and engineer.

Providence Gas Co., Providence, R. I., is planning an addition to coal-gas manufacturing plant, to cost about \$500,000 with machinery.

Phillips Wire Co., Pawtucket, R. I., is arranging for purchase of adjoining property, 120 x 313 ft., for an addition, primarily for rolling mill service. Company is a subsidiary of General Cable Corporation, 420 Lexington Avenue, New York.

Lynn Gas & Electric Co., Lynn, Mass., has secured permission to dispose of capital stock in amount of about \$1,750,000, part of fund to be used for construction of new steam-operated electric power plant and other expansion. Contract for superstructure for station, 100 x 150 ft., has been let to P. J. MacNaughton Co., Lynn. Stone & Webster Engineering Corporation, 49 Federal Street, Boston, is engineer.

General Electric Co., Schenectady, N. Y., is planning for removal of meter-manufacturing plant from Indiana to Lynn Works, Lynn, Mass., where production will be extended.

Chemical Paper Mfg. Co., Holyoke, Mass., is planning addition, comprising two and three-story units, 50 x 195 ft., and 35 x 75 ft., respectively, to cost more than \$200,000 with equipment.

The Crane Market

A GOOD volume of inquiry is in the market for small capacity overhead cranes and electric hoists. The Western Electric Co., New York, has closed on 10 overhead cranes and an inquiry is reported in preparation by another company for a list of seven 1-ton, two 2-ton short span hand power cranes with electric hoists and one 5-ton, 50-ft. span electric crane. Fox Brothers & Co., New York, are asking prices on a 7-ton hand power crane and 2-ton, 3-motor overhead crane for export to a sugar mill. The New York, New Haven & Hartford Railroad is not yet reported to have closed for either a small capacity gantry crane or a used locomotive crane, for which it has been inquiring for some time. The Baltimore & Ohio Railroad is expected to close soon on eight 25-ton locomotive cranes.

On the Pacific Coast the Board of Supplies, Hall of Records, Los Angeles, will open bids June 10 on an overhead traveling crane for the Los Angeles County farm at Hondo.

Among recent purchases are:

Western Electric Co., New York, 10 overhead cranes for the Baltimore Cable Co., Baltimore; one 50-ton, one 40-ton,

four 15-ton, one 10-ton, one 7½-ton and two 5-ton cranes from Cleveland Crane & Engineering Co.

Joslyn Mfg. & Supply Co., Oakland, Cal., 3-ton, 34-ft. 6-in. span, 3-motor overhead crane from Milwaukee Electric Crane & Mfg. Corporation.

Newton Steel Co., Monroe, Mich., eight electric cranes from Alliance Machine Co.

H. D. Conkey & Co., Mendota, Ill., have recently received award of the following overhead cranes: Texas Public Utilities Corporation, Bowie, Tex., 1-ton, 35-ft. span hand power crane; Dallas Brass & Copper Co., Chicago, 1-ton special push crane and 1-ton pivot crane; J. L. Simmons Co., Bloomington, Ill., 5-ton, 47-ft. span double girder hand power crane; Laclede Steel Co., St. Louis, 5-ton, 24-ft. 5-in. span hand power crane; Consolidated Machine Tool Corporation, Rochester, N. Y., 3-ton, 20-ft. 11½-in. span, 3-motor crane; Miehle Printing Press & Mfg. Co., Chicago, 5-ton, 12-ft. 3-in. span, single I-beam electric crane; Iowa Steel & Iron Co., Cedar Rapids, Iowa, 5-ton, 35-ft. span, 3-motor crane; Colonial Steel Co., Pittsburgh, 1-ton, underhung push type crane; Walworth Co., South Boston, Mass., 1-ton push type crane.

Wiremold Co., 410 Asylum Street, Hartford, manufacturer of conduits, electric-wiring devices, etc., will take bids at once for first unit of new plant at Elmwood, two stories, 98 x 200 ft., to cost over \$50,000 with equipment. Greenwood & Noerr, 525 Main Street, are architects and engineers.

White Motor Co., 265 Shrewsbury Street, Worcester, Mass., has plans for new one-story service, repair and garage building, reported to cost more than \$150,000 with equipment.

Philadelphia

PHILADELPHIA, May 27.—Ford & Kendig Co., Fifteenth and Callowhill Streets, Philadelphia, manufacturer of pipe fittings, mill supplies, etc., have plans for new one-story pipe fabricating plant on site recently secured, to cost more than \$350,000 with equipment.

Atlas Electric Co., 916 Green Street, Philadelphia, manufacturer of electrical equipment and supplies, is having plans revised for two-story addition, including improvements in present plant, to cost about \$40,000 with equipment. Heacock & Hokanson, 1211 Chestnut Street, are architects.

Packard, Inc., Broad Street and Park Avenue, Philadelphia, local representative for Packard automobile, has purchased adjoining property, 107 x 265 ft., for addition to service, repair and sales building, to cost more than \$150,000 with equipment. It is understood that plans will be prepared by Albert Kahn, Inc., Marquette Building, Detroit, architect and engineer.

Federal Container Co., Fifty-sixth Street and Paschall Avenue, Philadelphia, manufacturer of corrugated paper and cardboard containers, etc., has awarded general contract to Barrett & Hilp, Inc., Philadelphia, for addition to cost more than \$80,000 with equipment. Leland S. Rosener, 233 Sansome Street, San Francisco, is architect. Company is a sub-

sidary of Paraffine Companies, Inc., San Francisco.

Philadelphia & Reading Coal & Iron Co., Reading Terminal, Philadelphia, has plans for new centralized electrically-operated coal breaker in eastern Pennsylvania anthracite coal district, to cost \$3,500,000 with equipment. A second unit of like size will be built later. Company will also carry out electrification program at mines, to cost more than \$1,000,000 additional. Andrew J. Maloney is president.

Thomas Maddock's Sons Co., Ewing Street, Trenton, N. J., manufacturer of sanitary ware, has plans for a two-story addition, 80 x 100 ft., to cost about \$50,000 with equipment. J. Osborne Hunt, Hunt Building, is architect.

Department of Public Works, Trenton, N. J., Abram Swan, Jr., director, has plans for electrification of municipal pumping plant in Stacy Park, including installation of two electric alternators and accessories, to cost about \$45,000.

Oliver United Filters, Inc., Hazleton, Pa., manufacturer of filtering and kindred equipment, has awarded general contract to R. H. Woelfel, American Bank Building, for two-story addition to cost about \$60,000 with equipment. Headquarters of company are at San Francisco. Reed & Corlett, Oakland Bank Building, Oakland, Cal., are architects.

Pennsylvania Water & Power Co., Holtwood, Pa., has acquired additional property in vicinity of Conestoga Creek, near Safe Harbor, Pa., and is said to be planning construction of hydroelectric generating plant, to cost more than \$1,000,000 with transmission lines.

Lumber & Millwork Co. of Philadelphia, Inc., York Road near Butler Street, is planning to rebuild part of plant and shops in Millbourne district, recently destroyed by fire.

J. M. Thomson, Coatesville, Pa., and associates have organized Best Body Co., with capital of \$25,000, to operate local plant for manufacture of automobile truck and dump bodies, mechanical equipment and kindred motive apparatus.

Raymond C. Templin and Leonard R. Mackay, Coatesville, are also interested in organization.

Lebanon Boiler Works, Inc., Lebanon, Pa., is offering for sale its complete plant, including property, buildings, equipment and raw materials. Plant is equipped to manufacture boilers, tanks or fabricated steel.

South Atlantic

BALTIMORE, May 27.—A tract of 25 acres in Dundalk section of Baltimore has been acquired by Curtiss-Caproni Corporation, an interest of Curtiss Aeroplane & Motor Co., Kail Street, Buffalo, as site for new plant to manufacture heavy type aircraft, including seaplanes, with units for parts production and assembling. It is scheduled for completion within six to seven months, and will cost more than \$500,000 with machinery. Frank H. Russell is president, and G. C. Westervelt, general manager.

Pangborn Corporation, Hagerstown, Md., manufacturer of sand-blast equipment, has plans for one-story addition, to cost more than \$100,000 with machinery.

Mutual Cold Storage Co., Harrisonburg, Va., is completing plans for six-story cold storage and refrigerating plant addition, to cost about \$100,000 with equipment.

Frank Herbst, Wilmington, N. C., manufacturer of marine equipment, is arranging for establishment of new plant unit to manufacture propeller and transmission units, to cost about \$25,000. Installation will include lathes, drill press, boring machine, grinding and polishing machines and other tools.

Eastern Silica & Chemical Corporation, Gore, near Winchester, Va., will soon begin installation of crushing machinery, mechanical washers, chaser mills, conveying apparatus, and other equipment in connection with general expansion now under way. Work has been started on a new tippie. An electric power station will be built for service at mines and mill. Entire program will cost more than \$125,000.

Taylor Iron Works & Supply Co., Broadway, Macon, Ga., has begun work on a one-story addition, to be used largely as a steel fabricating shop, to cost over \$35,000. Plans are being considered for two other one-story units.

Lone Star Cement Co. of Virginia, Inc., Norfolk, a subsidiary of International Cement Corporation, New York, has awarded general contract to Rust Engineering Co., Pittsburgh, for packing, storage and distributing plant at Washington, to cost more than \$150,000 with equipment.

Firestone Tire & Rubber Co., Akron, Ohio, has plans for three-story factory branch, storage and distributing plant at Richmond, Va., to cost over \$150,000 with equipment. R. F. Dixon is local manager.

Sylvania Industrial Corporation, 122 East Forty-second Street, New York, recently organized with capital of \$3,500,000 to manufacture industrial chemicals, has acquired about 200-acre tract near Fredericksburg, Va., as site for new works, with boiler plant, machine shop and auxiliary structures, to cost \$1,000,000 with machinery. It is expected to have plant ready for service within eight to nine months. Roger N. Wallach, head of Grasselli Dye Stuff Corporation, 1150 Broadway, New York, is president of new company; Frank H. Reichel is general manager.

International Harvester Co., 606 South

Michigan Avenue, Chicago, has awarded general contract to J. A. Jones Construction Co., Charlotte, N. C., for one-story and basement factory branch, storage and distributing plant at Charlotte, 100 x 210 ft., to cost about \$100,000 with equipment.

City Council, Roanoke, Va., has approved lease of about 125 acres at Canagay field for establishment of municipal airport, to include hangars, repair shops and other field units, to cost more than \$70,000 with equipment. W. P. Hunter is city manager, in charge.

Pittsburgh

PITTSBURGH, May 27.—Machinery business in this district continues to show improvement, although purchases still are confined largely to single items. No new lists of size have appeared, but local offices are busy revising specifications on old inquiries which are becoming more active. There are also a number of large projects in this and nearby territory which are moving forward quite rapidly and on which equipment requirements will soon be made known. Among these is the A. M. Byers Co. plant at Ambridge, Pa., which is said to be somewhat ahead of schedule.

Makers of rolling mill machinery in this district are operating at a better rate than for some time and are receiving a steady flow of new orders. The Newton Steel Co., Youngstown, is placing equipment for its new sheet mill at Monroe, Mich., and the new plant of the Great Lakes Steel Corporation, near Ecorse, Mich., will require considerable machinery which is now being actively figured.

Contract has been let by Heppenstall Knife & Forge Co., 4720 Hatfield Street, Pittsburgh, to Cuthbert Brothers, Bessemer Building, for one-story addition, 40 x 120 ft., with extension, 20 x 90 ft., to cost about \$45,000 with equipment.

Ruud Mfg. Co., Twenty-ninth and Smallman Streets, Pittsburgh, manufacturer of automatic gas water heaters, parts, etc., has begun erection of an addition to cost more than \$40,000.

Pittsburgh Plate Glass Co., Frick Building, Pittsburgh, has asked bids on general contract for new sheet glass manufacturing plant at Henryetta, Okla., to cost about \$2,000,000 with machinery. H. S. Heichert, Grant Building, Pittsburgh, is engineer.

West Virginia Rail Co., Huntington, W. Va., has begun construction of two one-story units, 100 x 500 ft., and 80 x 300 ft. Works will be electrified. Expansion will cost about \$160,000 with equipment. Harry A. Zeller is vice-president and general manager.

Officials of Austin Motor Co., Ltd., London, England, are said to be concluding arrangements with Standard Steel Car Co., Frick Building, Pittsburgh, for purchase of part of plant of latter company at Butler, Pa., particularly section formerly given over to production of Standard automobile, discontinued some time ago. Purchasing company will remodel property to manufacture popular priced Austin automobile; new equipment will be installed throughout.

Board of Education, Apollo, Pa., contemplates installation of manual training equipment in three-story high school to cost \$200,000, for which it is expected to ask bids on general contract late in June.

A. L. Thayer, Greer Building, New Castle, Pa., is architect.

North American Refractories Co., Cleveland, has opened a district sales office in Koppers Building, Pittsburgh, in charge of J. E. Purtell, district sales manager.

Standard Steel Propeller Corporation, Pittsburgh, manufacturer of metal aircraft propellers, has begun work on enlargement of its plant at Homestead, Pa., to about five times its present capacity. This is fourth time since its formation in 1919 that company has enlarged its facilities.

Detroit

DETROIT, May 27.—Expansion and improvement program will be carried out by American Show Case & Mfg. Co., 5235 Grand River Avenue, Detroit, at new branch plant at Muskegon, Mich., lately acquired, to cost \$200,000 with equipment. Kelly Kaufman is vice-president in charge of production.

Federal Screw Works, Inc., Martin Avenue and line of Michigan Central Railroad, Detroit, will soon take bids on general contract for one-story addition, to cost over \$45,000 with equipment. Robert Finn, 415 Brainard Streets, is architect.

Officials of Grand Rapids Metalcraft Corporation, Grand Rapids, Mich., headed by R. W. Hook, president, are organizing Metalcraft Heater Corporation, a subsidiary, to manufacture automobile heaters. New company will take over Bovey Automobile Heater Co., 3911 Prairie Avenue, Chicago, and will consolidate with organization. Plant will be operated at Grand Rapids in conjunction with that of parent company.

Ternstedt Mfg. Co., 6307 West Fort Street, Detroit, manufacturer of automobile hardware, a subsidiary of Fisher Body Corporation, Detroit, has awarded general contract to J. A. Utley, 700 Harper Avenue, for two-story addition, 125 x 134 ft., to cost about \$100,000 with equipment.

A. A. Schantz, president, Detroit-Cleveland Navigation Co., foot of Wayne Street, Detroit, and associates have secured American rights to manufacture German Dornier-Wal multi-motored flying boats, now being produced by Dornier-Wal Co., Friedrichshafen, Germany. New company is being organized under name of American Dornier Co., and plans are being arranged for manufacture of units at Detroit. Flying boats are designed to hold 25 passengers and will be used for an aerial line between Detroit and Cleveland.

Grand Trunk Railway Co., 400 East Jefferson Street, Detroit, has plans for engine house, machine shops, forge shop and other units at Pontiac, Mich., to cost over \$150,000 with equipment. Engineering department of railroad is in charge.

Board of Education, Calumet, Mich., is said to be planning installation of manual training equipment in three-story high and grade school, to cost over \$300,000, to replace structure recently destroyed by fire. Bids will soon be asked on general contract. J. D. Chubb, 109 North Dearborn Street, Chicago, is architect.

United Forge & Machine Co., 2145 Franklin Street, Detroit, is planning expansion in alloy and machine die forgings and other specialties. Alan C. Prince is president and general manager.

Independent Gas Cock Co., Jonesville, Mich., has been organized and is engaging in the manufacture of gas cocks. W. S.

Killam is president and Phillips E. Welton vice-president and sales manager. Mr. Killam was formerly president of General Brass Co.

Nicholl-Hale Chrome Service, Inc., 1834 Garfield Avenue, Detroit, has been organized to do chrome plating on dies, tools, gages, etc. P. P. Hale is vice-president and general manager.

Rochester Screw Co., Rochester, Mich., has been organized by Gorham C. Parker and has taken over Rochester Metal Products Co. New company is capitalized at \$30,000, and will manufacture automatic machine screw products for automobile industry. It will also develop a line of tools and appliances for distribution through mill supply houses.

Buffalo

BUFFALO, May 27.—Houdaille-Hershey Corporation, 537 East Delavan Avenue, Buffalo, manufacturer of automobile shock absorbers and kindred products, has authorized increase in capital to 1,500,000 shares of stock, no par value, considerable part of fund to be used for expansion. Company is concluding negotiations for merger with General Spring Bumper Corporation, Detroit, with plant to be continued at that location.

Trico Products Corporation, 817 Washington Street, Buffalo, manufacturer of automatic windshield cleaners and similar automotive accessories, has filed plans for one-story addition, to cost about \$100,000 with equipment.

Iron Fireman Stoker Co., Buffalo, has been organized with capital of \$100,000 to take over and expand company of same name with headquarters in Morgan Building, manufacturer of stokers, furnaces and other heating equipment. New organization is headed by George R. Becker, Eggertsville, and Paul H. Gearhart, Buffalo.

Airport advisory committee of City Planning Commission, Jamestown, N. Y., is planning fund of \$150,000 for construction and operation of municipal airport to include hangars, repair shops, oil storage and other buildings.

LaFrance-Republic Corporation, Elmira, N. Y., has been formed by officials of American-LaFrance & Foamite Corporation, with local plant, and Republic Motor Truck Co., Inc., Alma, Mich., to take over and consolidate commercial truck division of first-noted company, with main plant at Bloomfield, N. J., and last-noted corporation. Linn Mfg. Corporation, Morris, N. Y., manufacturer of farm and road tractors, a subsidiary of Republic company, will be included in merger, as well as Detroit Patents Holding Co., Detroit, and Republic Truck Sales Corporation, Alma. Production will be concentrated largely at Alma, where expansion will be carried out. Charles B. Rose is president of consolidated company, and R. W. Stork, treasurer.

Irving Air Chute Co., 372 Pearl Street, Buffalo, manufacturer of parachutes, etc., is planning for expansion and proposes establishment of foreign branch manufacturing plants in France, Germany and Italy. George Waite, president, has left for Europe to secure sites and arrange details. Entire project is reported to cost more than \$350,000.

Thompson Foundry, Inc., Silver Creek, N. Y., has been incorporated to take over foundry business conducted by Thompson & Son, a partnership.

Cleveland

CLEVELAND, May 27.—Machine tool business continues good, although there has been some tapering off in dealers' orders and the aggregate volume this month is expected to fall somewhat below that of April. Business is well distributed among various industries, not a great deal coming from the automotive industry. The airplane industry is still buying considerable equipment.

Demand for turret lathes continues heavy and a local manufacturer reports that its May sales will show a gain over April. Orders are nearly all for single machines. This manufacturer is from 60 to 70 days behind on shipments. Some prospective customers are anxious to secure machines for earlier deliveries.

Contract has been let by Merit Equipment Co., 6616 Morgan Avenue, Cleveland, manufacturer of drills, presses, pumps and kindred equipment, to Truscon Steel Co., 4600 Euclid Avenue, for one-story addition, 50 x 100 ft., with extension, 20 x 35 ft., to cost about \$50,000 with equipment.

Doehler Die-Casting Co., Toledo, Ohio, is considering new plant unit to cost more than \$400,000 with machinery.

Goodrich Co., Akron, Ohio, is planning an expansion program at branch plant at Los Angeles to increase output to 5500 tires and 5000 tubes daily; department will be provided for production of tires for airplanes. Work will cost more than \$100,000.

Atlas Steel & Supply Co., 4401 Trumbull Avenue, Cleveland, has awarded general contract to Nameth Co., 3151 West Ninety-fourth Street, for one-story addition, 50 x 200 ft., to cost about \$50,000 with equipment. R. H. Hinsdal, Erie Building, is architect.

Board of Education, Brecksville, Ohio, is said to be planning installation of manual training equipment in two-story high school to cost \$200,000, for which bids have been asked on general contract. Miller & Sons, 12 West Madison Street, Youngstown, are architects.

Cleveland Union Terminal Co., Terminal Tower, Cleveland, has awarded general contract to Aronberg-Fried Co., same address, for one-story machine and mechanical repair shop, 100 x 300 ft.; and one-story inspecting works, 40 x 200 ft., to cost over \$225,000 with equipment.

Officials of Winton Engine Co., Cleveland, are organizing Winton Aviation Engine Co., a subsidiary, and will use part of works for development of Diesel engines for aircraft, including parts manufacture and assembling. Parent company, specializing in production of marine Diesel and gasoline engines for power plants generator sets, etc., is disposing of stock issue to total about \$2,400,000, part of fund to be used for expansion of new subsidiary. George W. Codrington is president.

Globe Steel Barrel Co., Cleveland, has purchased a building on Washington Avenue, N. W., formerly occupied by Cleveland Railway Co. as a power house, which it will remodel for a barrel manufacturing plant. Company plans to spend \$50,000 for equipment and \$40,000 for improvements and will move from its present quarters at 8205 Franklin Avenue. New plant will provide considerable increase in manufacturing space.

Klotz Machine Co., Sandusky, Ohio, has been organized with capital stock of \$75,000 and has taken over property of

corporation of same name. New organization expects to add several new lines in near future. Its present products include wine presses, grape grinders, pumps and iron and brass castings.

Chicago

CHICAGO, May 27.—As the end of May approaches it is apparent that aggregate sales will not be as heavy as in the preceding month. Inquiries are scattered and it is more evident that the delivery situation is an important factor in the check on sales of new machine tools. Buyers, facing retarded shipments, have turned in increasing number to the used machine tool market which now is well drained, especially since the shipment, within the week, of a cargo of old tools to a purchaser in western Michigan.

A bright spot, however, is that several farm implement manufacturers may soon spend over \$1,500,000 for new equipment. A motor builder in western Michigan has placed a sizable order for drilling equipment and the Pullman Car & Mfg. Corporation has ordered three planers for plants near Chicago. Sellers are actively working on the Union Pacific list; otherwise the railroad field is quiet.

Brust Harig Mfg. Co., 1735 Carroll Avenue, Chicago, was recently organized to operate a tool and die jobbing shop. A machine shop, which will be ready for occupancy about July 1, is under construction.

Plans are being arranged by Chicago Hardware Foundry Co., 549 West Washington Boulevard, Chicago, for one-story addition at North Chicago, to cost about \$30,000 with equipment. S. A. Simonson is company engineer.

Quality Hardware & Machine Corporation, 5849 Ravenswood Avenue, Chicago, has filed plans for one-story addition, 75 x 150 ft., to cost about \$50,000 with equipment.

Evans Flexible Reamer Corporation, 3513 Lincoln Avenue, Chicago, has asked bids on general contract for three-story addition, to cost about \$90,000 with equipment. Guske & Foster, 3725 Devon Street, are architects.

Edison Electric Appliance Co., 5600 West Taylor Street, Chicago, has acquired block of property on Waller Avenue, occupied in part by one building, and will use for expansion. Purchasing company is said to be planning new units.

Minneapolis-Honeywell Regulator Co., Minneapolis, Minn., manufacturer of heating equipment, etc., has acquired adjoining property and plans addition to cost about \$225,000, of which about \$75,000 will be expended for equipment. Expansion is also planned at branch plants at Wabash, Ind.

Iowa Railway & Light Co., Cedar Rapids, Iowa, is planning extensions and improvements in artificial gas plant at Vinton, Iowa, including installation of boilers, pumping machinery and other equipment. Frank R. Patton is general manager.

Great Western Sugar Co., Sugar Building, Denver, has plans for new beet sugar mill at Wheatland, Wyo., with boiler plant, machine shop and other buildings, to cost \$1,000,000 with machinery.

General Mills, Inc., Minneapolis, Minn., has plans for new grain elevator, to cost more than \$1,500,000 with elevating, conveying, screening and other equipment.

City Council, City Hall, Cedar Rapids, Iowa, L. J. Storey, city clerk, will receive bids until June 12 for equipment for municipal waterworks, including pumping machinery, filter equipment, steel tanks, clarifier apparatus, meters, valves, gates and accessories. H. F. Blomquist is superintendent of city waterworks. Alvord, Burdick & Howson, Hartford Building, Chicago, are consulting engineers.

Sall Brothers, Inc., Kishwaukee Street, Rockford, Ill., manufacturer of automobile heaters, castings, oil distributing apparatus, etc., has awarded general contract to Linden & Son, 1110 Tenth Street, for one and two-story addition, 66 x 144 ft., and 56 x 95 ft., respectively, to cost about \$80,000 with equipment.

Union Pacific Railroad Co., Omaha, Neb., plans extensions and improvements in the plant at Laramie, Wyo., including installation of boilers, engine and other equipment.

General Engineering Works has moved from 340 West Huron Street to its new plant at 4701 West Division Street, Chicago.

Milwaukee

MILWAUKEE, May 27.—Machine-tool business in May is generally reported as equal to that of April, although in some cases there has been a slight recession in volume. However, all builders are operating at capacity and bookings guarantee a high rate of production for several months. Inquiry is relatively good and orders are being received steadily.

Malleable Iron Range Co., Beaver Dam, Wis., has placed general contract with Hutter Construction Co., 128 Western Avenue, Fond du Lac, Wis., for an addition to enameling shop to cost about \$25,000.

Twin Disc Clutch Co., 1328 Racine Street, Racine, Wis., contemplates construction of machine shop addition and enlargement of boiler house. No estimate of cost is as yet available.

Fish Rotary Oven Co., Walworth, Wis., manufacturer of bakery equipment, has placed general contract with Cunningham Brothers, 650 Third Street, Beloit, Wis., for new plant, 100 x 260 ft., one story, at Beloit, to cost about \$100,000 complete.

Chatfield Machine & Foundry Works, 718 Stephenson Avenue, Escanaba, Mich., is making repairs and replacements necessitated by fire damage May 20.

Jacobsen Mfg. Co., Fifteenth and Clark Streets, Racine, Wis., manufacturer of power lawn mowers, has purchased a four-story unit of 93,000 sq. ft. of former H. & M. Body Corporation group in Racine from Murray Body Corporation, Detroit, and will remodel for new plant.

Teleoptic Corporation, Racine, Wis., recently organized to manufacture electrical signal devices and communicating systems for hospitals, hotels, industrial plants, etc., has leased second floor of Terminal Building at Racine and is purchasing equipment. Herbert F. Johnson, Jr., is president; B. L. Bobroff, Milwaukee, vice-president and chief engineer; George Tromvig, Milwaukee treasurer, and Julius Leiser, Milwaukee, secretary.

Pheasant Aircraft Corporation, Mem-

phis, Mo., has been acquired by T. W. Meiklejohn and associates of Fond du Lac, Wis., and is transferring operations to Fond du Lac. Leased quarters will be occupied pending construction of new plant costing about \$30,000. Company is being reincorporated in Wisconsin with \$100,000 capital. Roy B. Moore is retained as works manager and chief pilot.

Quality Aluminum Casting Co., 1231 Lincoln Avenue, Waukesha, Wis., has plans by Martin F. White, 7111 National Avenue, West Allis, for an addition, 88 x 105 ft., part two stories and basement. A. G. Pankratz is president and general manager.

J. I. Case Threshing Machine Co., 700 State Street, Racine, Wis., has placed general contract with Borrowman & Jamieson, Winnipeg, for one-story addition, 100 x 200 ft., to branch factory, assembly plant and warehouse at Winnipeg. Frank J. Hoffman, Janes Block, Racine, is architect. Cost is estimated at \$100,000.

Cincinnati

CINCINNATI, May 27.—Bookings of local machine tool builders dropped off considerably the past week, with the result that business this month is likely to show a decline of 5 to 10 per cent from that of April. However, pending inquiries are of substantial volume and indicate that sales in the next 30 days should be of good proportions. Machine tool executives anticipate some falling off in orders with the approach of summer, nevertheless are of the opinion that the recession will not be serious.

Although the end of the month is likely to show a reduction in unfilled orders, machine tool plants still have a large amount of work ahead and operations probably will continue at a high level during the summer. Recent bookings have consisted almost entirely of orders for one or two machines each, and have been well distributed among buying sources.

American Laundry Machinery Co., Ross and Section Avenues, Norwood, Ohio, has purchased plant and assets of Adams Laundry Machinery Co., Kenilworth, N. J., and will operate latter as branch. Robert West, president of Adams Co., will continue in charge.

Powel Crosley, Jr., president Crosley Radio Corporation, Colerain Avenue and Sassafras Street, Cincinnati, has purchased 193 acres on Sharon Avenue, Sharonville, Ohio, and will erect an airplane factory and hangar. Airplane company will be independent of Crosley Radio Corporation.

Bids will soon be asked by Firestone Tire & Rubber Co., Akron, Ohio, for new factory branch, storage and distributing plant at Cincinnati, to cost about \$150,000 with equipment. Samuel Hannaford & Son, Dixie Terminal Building, Cincinnati, are architects.

Embry-Riddle Co., Cincinnati, operating Cincinnati Airport, is said to be arranging for purchase of 140 acre tract at Chesapeake, near Ironton, Ohio, for new airport to serve tri-state district centering in that section. Project will include hangars, shops and other buildings to cost over \$125,000 with equipment.

Columbus Railway, Power & Light Co., 215 North Front Street, Columbus, Ohio, has plans for addition to power plant, to cost about \$40,000 with equipment.

Buckeye Cotton Oil Co., subsidiary of Procter & Gamble Co., Ivorydale, Cincinnati, has purchased property at Chattanooga, Tenn., including lease of plant of Chattanooga Cotton Oil Co., for new factory. Plans are under consideration for new unit to cost more than \$500,000 with machinery. Production will be given over to crude cottonseed oil, hulls, lint, etc. Mercer Reynolds is president.

Marquette Cement Mfg. Co., 140 South Dearborn Street, Chicago, and U. & P. Bank Building, Memphis, Tenn., will soon begin erection of new storage and distributing plant at Memphis, to cost about \$100,000 with equipment.

Kentucky Derby Coal Co., Madisonville, Ky., H. H. Coil, president, is planning installation of mining and operating equipment at coal properties about three miles from Madisonville. Conveying, hoisting and other mechanical handling equipment will be installed.

Board of Education, Eighth and Chestnut Streets, Louisville, plans installation of manual training equipment in new Parkland junior high school to cost \$450,000, for which bids are being asked on general contract until June 4. J. Meyrick Colley is architect for board, address noted.

Gulf States

BIRMINGHAM, May 27.—Bids have been asked by Packard Motor Car Co., New Orleans, headquarters at Detroit, for two-story factory branch, service, repair and sales building, 120 x 150 ft., to cost more than \$120,000 with equipment. Albert Kahn, Inc., Marquette Building, Detroit, is architect.

King Whiteway Co., Sheffield, Ala., manufacturer of ornamental street-lighting equipment and fixtures, is considering plant enlargements to cost more than \$30,000 with machinery. Company is subsidiary of Union Metal Mfg. Co., Canton, Ohio.

Central Texas Refining Co., Corsicana, Tex., has begun construction of new oil refinery near Lockhart, Tex., to have output of about 2,000 bbl. daily, to cost more than \$250,000.

City Council, Beaumont, Tex., has plans for municipal airport, for which an appropriation of \$100,000 has been authorized, to include hangars, repair and reconditioning shops and other units. R. C. Black is city engineer, in charge.

Hughes Tool Co., Hughes Street, Houston, Tex., will soon begin erection of one-story addition, 140 x 400 ft., to cost \$100,000.

Roth Brothers Auto Supply & Machine Co., North Flores Street, San Antonio, Tex., plans three-story addition to service, repair and garage building, to cost about \$100,000 with equipment.

Rio Grande Oil Co., El Paso, Tex., is planning extensions to local oil refinery, largely for production of lubricating oils, to cost over \$725,000 with machinery.

City Council, Fort Worth, Tex., plans municipal airport to cost \$500,000, and will hold special election in June for approval of bond issue in that amount. Project will include hangars, repair shops, oil storage and other units. O. E. Carr is city manager.

Gulf Refining Co., Port Arthur, Tex., plans rebuilding part of local oil refinery destroyed by fire May 19.

Yellow Cab Co., 424 Dolores Street, San Antonio, Tex., has plans for service, repair and garage building, totaling about

50,000 sq. ft. floor space, to cost over \$100,000 with equipment. Phelps & De-wees, Gunter Building, are architects; W. E. Simpson Co., National Bank of Commerce Building, is engineer.

Board of Trustees, University of Texas, Austin, is asking bids on general contract until June 8 for a mechanical engineering laboratory, to cost \$175,000 with equipment. Herbert M. Greene, La-Roche & Dahl, Construction Industries Building, Dallas, Tex., are architects.

Humble Oil & Refining Co., Houston, Tex., has begun construction of oil storage and distributing plant at Corpus Christi, Tex., including service, repair and garage building for motor trucks, to cost \$100,000 with equipment.

City Levee Board, New Orleans, has plans for a municipal landing field on Lake Ponchartrain, near city limits, for aircraft and seaplanes, to include hangars, repair shops, and other buildings, to cost \$610,000 with equipment.

Central Power & Light Co., San Antonio, Tex., has plans for a hydroelectric generating plant on Devil's River, near Del Rio, Tex., where site has been acquired about three miles from junction with Rio Grande River. It will have initial capacity of 20,000 hp., and will cost more than \$1,000,000 with transmission lines, switching stations and other structures.

St. Louis

ST. LOUIS, May 27.—Contract has been let by Nicholas-Beazley Airplane Co., Inc., Marshall, Mo., to E. E. Page, local, for one-story addition to aircraft manufacturing plant, 50 x 150 ft., to cost about \$50,000 with equipment.

Ready-Mixed Concrete Co., Lydia Avenue and Eighty-seventh Street, Kansas City, Mo., is planning to rebuild part of plant, including rock crusher and pulverizing division, destroyed by fire May 19.

Curtis Harvesters, Inc., Kansas City, Mo., manufacturer of harvesting and other agricultural machinery, has plans for two-story and basement plant, 225 x 400 ft., at North Kansas City, to cost over \$400,000 with equipment. McKecknie & Trask, Board of Trade Building, are architects. George T. O'Maley is head.

MacMillan Petroleum Products Co., El Dorado, Ark., is said to be planning new oil refinery, to cost over \$200,000 with machinery.

Spartan Aircraft Co., North Wheeling Street, Tulsa, Okla., has awarded general contract to Austin Co., St. Louis, for hangar, 100 x 160 ft., with two lean-to extensions, 45 x 160 ft., at Tulsa municipal airport; installation will include repair and reconditioning shop. Russell B. Shaw, Arcade Building, is architect.

Southwestern Gas & Electric Co., Shreveport, La., has plans for extensions and improvements in power plant at Mena, Ark., including installation of Diesel engine units and other equipment, to cost over \$80,000.

F. F. Porterfield, president of American Eagle Aircraft Corporation, Fairfax Airport, Kansas City, Mo., and associates, have organized Porterfield Aviation Interests, Inc., to take over American Eagle company and other properties. Negotiations are said to be completed for acquisition of Lincoln Aircraft Co., Inc., Lincoln, Neb., manufacturer of Lincoln-Page biplanes, and holding manufacturing rights for Lincoln-Rocket airplane engines. Expansion will be carried out at Kansas City works, including one or two new plant units. American Eagle com-

pany is arranging for increase in capital from 200,000 shares of stock, no par value, to 2,000,000 shares, no par value.

W. C. Norris Mfg. Co., 7 North Frisco Avenue, Tulsa, Okla., manufacturer of mechanical equipment, has plans for one-story machine shop, 35 x 85 ft., to cost about \$20,000 with equipment. J. W. Robb, 1114 South Boston Street, is architect.

Nebraska Power Co., Omaha, is said to be planning a hydroelectric power plant near Spalding, Neb., to cost about \$150,000 with equipment. A transmission line will be built.

City Council, Muskogee, Okla., has plans for municipal airport, including hangars, repair shops, oil storage and other buildings, to cost about \$200,000 with equipment. Austin Co., Cleveland, is engineer. Hugh Dickson is city engineer.

State Board of Administration, State House, Topeka, Kan., will build a two-story plant to manufacture metal automobile license plates at State prison, Hutchinson, Kan., to cost about \$25,000 with equipment.

Indianapolis

INDIANAPOLIS, May 27.—Plans are being considered by Overmyer Mould Co., Winchester, manufacturer of metal molds, for one-story addition, to cost about \$30,000 with equipment.

Auburn Automobile Co., Auburn, will soon take bids for one-story addition to cost about \$75,000 with equipment. A. M. Strauss, Cal-Wayne Building, Fort Wayne, Ind., is architect.

Redinger-Ball-Morris Co., Logansport, manufacturer of cutouts, relays and other kindred electrical equipment, has asked bids on general contract for one-story addition, 60 x 180 ft., to cost about \$30,000 with machinery. William G. Rammel, Barnes Building, is architect.

George J. Mayer & Co., 36 South Meridian Street, Indianapolis, manufacturers of stamps, seals, dies, etc., have awarded general contract to Brown & Mick, 226 East Michigan Street, for one-story addition, 50 x 85 ft., to cost about \$23,000 with equipment. Vonnegut, Bohn & Mueller, Indiana Trust Building, are architects.

Northern Indiana Public Service Co., Hammond, is asking bids on general contract until June 3 for first unit of new steam-operated electric generating plant at Michigan City, Ind., two stories and basement, 155 x 405 ft., to cost about \$1,000,000 with machinery. Holabird & Root, 333 North Michigan Avenue, Chicago, are architects; Sargent & Lundy, 72 West Adams Street, Chicago, are engineers.

Pacific Coast

SAN FRANCISCO, May 23.—Perfect Caster Mfg. Co., 3517 East Eleventh Street, Long Beach, Cal., has purchased 10-acre tract in nearby industrial development for new plant. Initial unit will be one story, 100 x 480 ft., with two-story administration building. Other shops will be built later. Entire project will cost more than \$150,000 with machinery.

Southern California Edison Co., Los Angeles, is planning new power substation at Torrance, Cal., to cost about \$500,000 with equipment, in connection with expansion program in that section.

Richfield Oil Co. of California, Inc., Los

Angeles, has arranged for bond issue of \$25,000,000, part of proceeds to be used for extensions and improvements in refineries and other oil properties.

Standard Paper Box Co., Los Angeles, manufacturer of corrugated paper containers, etc., is having plans drawn for seven-story and basement factory, 50 x 145 ft., to cost over \$200,000 with machinery. Edgar H. Cline, Petroleum Securities Building, is architect.

Seattle Chain Mfg. Co., 6921 East Marginal Way, Seattle, has awarded general contract to Herbert N. Taylor, 6826 Thirty-first Avenue, N. E., for one-story addition, 50 x 80 ft., for storage and distribution.

California-Oregon Power Co., Medford, Ore., is planning local power substation to cost more than \$100,000 with equipment. A new transmission line is contemplated from Dixonville to Marshfield, Ore., to cost over \$125,000 with switching stations and other facilities.

Joseph Kreutzer Corporation, Los Angeles, manufacturer of airplanes and parts, has acquired property at Culver City as site for new plant, to cost over \$85,000 with equipment. Present works will be continued.

Pickwick Stage Nite Coach Co., Los Angeles, has purchased a 5-acre tract of land near Mines Field, Inglewood, for new plant to manufacture motor stage coaches. Initial unit will be one story, 150 x 300 ft., for parts and assembling, and will cost more than \$100,000 with equipment.

Puget Sound Pulp & Paper Co., Bellingham, Wash., recently formed to take over and merge San Juan Pulp Mfg. Co., Bellingham, and Fidalgo Pulp Mfg. Co., Anacortes, Wash., is said to have plans for new wood pulp mill, to cost about \$3,000,000 with machinery. Company is affiliated with Coos Bay Lumber Co., San Francisco, and it is planned to build saw mill for handling raw material supply, to cost more than \$350,000 with equipment. Ossian Anderson heads new organization.

Canada

TORONTO, May 27.—Demand for machine tools is in good volume, but is mostly in small lots for replacement. Several fair-sized lists are being prepared for new plants. The railroads are steady buyers of single tools and are expected shortly to purchase considerable equipment for shop needs. No large lists are appearing from the automotive industry, but there is a good demand from garages and repair shops. A more active call for tools and general equipment is coming from the mining fields of northern Ontario, Quebec and Manitoba.

Canadian Pacific Railway Co. will build a roundhouse at its yards at Three Rivers, Que., to cost \$20,000. J. A. Bertrand is agent.

Plans are being prepared by Catto & Catto, architects, 1 Wellington Street East, Toronto, for a four-story addition to plant of James Morrison Brass Mfg. Co., Ltd., 93 Adelaide Street West, Toronto.

Fraser-Brace, Ltd., 107 Craig Street, West, Montreal, has been awarded general contract for a copper refinery at Copper Cliff, Ont., for Ontario Refinery Co. Consolidated Mining & Smelting Co. of Canada, Ltd., C. P. R. Building, Toronto; International Nickel Co., and others are interested in Ontario company. Proposed refinery will treat ores

from Frood mine and is expected to be completed within a year. It will represent an expenditure of about \$5,000,000.

Plans have been prepared for a municipal power plant at Hull, Que., to cost \$50,000.

City Council, Riviere du Loup, Que., will start work soon on a power development plant. George Ouimet is chief engineer.

Survey is under way at Brockville, Ont., with a view to new premises for James Smart Co., a subsidiary of Canada Foundries & Forgings, Ltd. Present location is unsuitable for extensions and larger production.

Construction work will start at an early date on the erection of an addition to the plant at St. Hyacinthe, Que., of the Goodyear Cotton Co. of Canada, Ltd., a subsidiary of the Goodyear Rubber Co., Toronto. The proposed building will cost \$1,000,000 and equipment to cost \$850,000 will be installed.

Sidway-Topliff Co., manufacturer of children's vehicles, has purchased building on Hook Avenue, West Toronto, and will install complete new equipment. F. R. Hodgins is president of company.

Western Canada

Bids will be received until June 4 by chairman on Public Utilities, at office of M. Petersen, city clerk, Winnipeg, for material, equipment and work incidental to general contract for construction of Slave Falls hydroelectric power plant on Winnipeg River. Plans at office of Winnipeg Hydro Electric System, 55 Princess Street, Winnipeg.

Alberta Wheat Pool, Calgary, Alta., will build addition to its grain elevator at Vancouver, B. C., to cost \$2,750,000.

Midland Pacific Terminal, Ltd., Vancouver, B. C., is calling for bids for an addition to its elevator on Burrard Inlet, to cost \$1,000,000.

W. D. Beath & Son, Ltd., 394 Symington Avenue, Toronto, manufacturer of electric hoists, barn door tracks, steel drums, etc., will start work soon on a plant at Winnipeg, Man. Company is also contemplating erection of a plant at Regina, Sask.

Brown Iron & Steel Works, St. Paul, Minn., is considering erection of a plant at Brandon, Man.

Harbor Board, Vancouver, B. C., contemplates an expenditure of \$3,000,000 on additions to its local grain elevators. Other improvements by the Harbor Board will bring the total proposed expenditure to \$10,000,000.

Foreign

PLANS are under way by two industrial companies at Marghera, Port of Venice, Italy, for new plants for production of aluminum, magnesium, magnesium-aluminum and kindred products. Information at office of Bureau of Foreign and Domestic Commerce, Washington, reference Italy No. 305770.

Greater London & Counties Trust, Ltd., London, England, a subsidiary of Utilities Power & Light Corporation, 327 South La Salle Street, Chicago, has acquired Shropshire, Worcestershire & Staffordshire Electric Co., operating at Birmingham, England, and vicinity, for price of \$12,000,000. Plans are under way for an addition to steam-operated electric power plant at Stroudport on Severn River, a holding of purchased company, to increase present capacity of 70,000 kw. to 170,000 kw., to cost more than \$1,500,000.

Transmission lines will be extended for service to iron and steel mills and other industries in district noted.

Knoll Aircraft Co., Wichita, Kan., Felix W. Knoll, president, is planning construction of plant at Mexico City, Mexico, to manufacture military and commercial aircraft. Works will include both parts and assembling departments, and will cost more than \$100,000 with equipment. Inter-Americas Air Transport Co., Mexico City, Javier S. Joffre, president, holding concessions for several air mail and passenger routes in Mexico, is interested in project.

Saugbrukeforeningen, Holden, Norway, manufacturer of pulp and paper products, has approved erection of new electrolytic bleaching plant for production of caustic soda as by-product. Work will be carried out with general expansion program, to cost more than \$1,500,000.

British Power & Light Corporation, London, England, has arranged for sale of stock issue to total about \$8,000,000, part of proceeds to be used for purchase

of controlling interest in North Wales Power Co. and Electric Distribution of North Wales & District, Ltd., and for extensions and improvements in power plants and system, including transmission line construction.

Union Carbide & Carbon Corporation, 30 East Forty-second Street, New York, has acquired controlling interest in Meraker Smelting Co., Ltd., Trondjhem, Norway, operating three plants for manufacture of calcium carbide and ferro-alloys, with four hydroelectric generating stations on Kopperaaen River for power service at manufacturing works, with present capacity of 18,000 hp. New owner plans expansion.

Pennsylvania Pump & Compressor Co., Easton, Pa., has appointed Wells Fargo & Co. Express S. A. Apartado Postal 361, Mexico City, as its agents in Mexico.

National Engineering Co., 549 West Washington Boulevard, Chicago, has appointed Wells Fargo & Co. Express, S. A., Mexico City, as its exclusive representative for Simpson sand mixers in Mexico.

New Trade Publications

Electric Welders.—Acme Electric Welder Co., 5621 Pacific Boulevard, Los Angeles, Cal. Set of bulletins in colors descriptive of new types of welders, methods of operation and maintenance.

Rivets.—National Rivet & Mfg. Co., Milwaukee. Rivet display and sample card, arranged with metal eyelets for easy mounting. Seventeen brass, copper and aluminum rivets are displayed in standard sizes and types for automotive, aeronautical and industrial purposes.

Cranes.—Whiting Corporation, Harvey, Ill. Bulletin No. 188 illustrates and describes the Tiger crane of improved design.

Heavy-Duty Chains.—American Chain Co., Bridgeport, Conn. Folder devoted to chains for cranes, dredges and overhead duty.

Power Transmission Chains.—Diamond Chain & Mfg. Co., Indianapolis. Booklet 102A of 20 pages illustrates many uses of chains in power transmission work. The booklet is entitled, "Reducing the Cost of Power Transmission," and it exploits the advantages of roller chains for this purpose.

Electric Motors.—Wagner Electric Corporation, St. Louis. Bulletin 151 of six pages illustrates and describes an air-jacketed motor totally inclosed and self-cooled. This is said to be dust-proof, splash-proof, sleet-proof, weather-proof and proof against acid and alkali fumes. It is built in several types and for a wide variety of uses.

Light Joists.—Truscon Steel Co., Youngstown. Catalog 607 of 16 pages illustrates and describes a type of nailer joist for buildings in which the floor loads are light. It is designed particularly for residences, apartments, stores, schools and institutions, where wood floors are employed. The rough floor is nailed directly to a wooden screed imbedded in the top chord of the steel joist.

Tube Couplings.—Parker Appliance Co., 10320 Berea Road, Cleveland. Loose-leaf bulletin featuring various types of tube couplings for copper and other pipe. Many applications are shown by illustrations.

Vertical Gas Engines.—Chicago Pneumatic Tool Co., 6 East Forty-

fourth Street, New York. Bulletin 782 of 16 pages illustrates and describes a line of vertical gas engines designed for high fuel efficiency. They are built with three, four or six cylinders, operating at 257 r.p.m., and with brake hp. of 225, 300 and 450. Illustrations show many details, dimension views, etc.

Alloy Steels.—American Manganese Steel Co., Chicago Heights, Ill. Folder of eight pages devoted to manganese steel for resistance to shock, wear and abrasion and to Fahlralloy for resistance to corrosion and heat. Illustrations are of a considerable number of applications of these two products to industrial uses.

Industrial Plant Lubrication.—E. F. Houghton & Co., Third and Somerset Streets, Philadelphia. Booklet of 56 pages devoted to the lubrication of machinery of all descriptions. Illustrations show applications in many industries, while the text takes the form of a treatise on the application of lubricants and the proper choice for various types of apparatus.

Fire Protection Tanks.—Chicago Bridge & Iron Works, 37 West Van Buren Street, Chicago. Booklet of 24 pages devoted to water storage tanks furnishing supplies for fire service, in either isolated industrial establishments or otherwise. These tanks are available in a number of sizes and shapes. Considerable information is given in the book as to methods of handling fire protection problems through the use of adequate water supply.

Combined Drill and Countersink.—National Twist Drill & Tool Co., 6522 Brush Street, Detroit. Circular illustrating and describing combined drills and counter sinks in several sizes and shapes. These are made both in carbon steel and in high-speed steel.

Oil Circuit Breakers.—Roller-Smith Co., 233 Broadway, New York. Bulletin 600 of 20 pages illustrates and describes type "O" oil switches and circuit breakers, which are made in capacities from 200 to 2000 amp., from 2500 to 15,000 volts and with interrupting capacities from 20,000 to 40,000 kva.

